



IMAGING SYSTEM INSTALLATION GUIDE

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VISTA Software Development
Technical Services

Preface

This guide is written to assist IRM personnel to install the **VISTA** Imaging V. 2.0 (Capture/Display) application. IRM personnel should have knowledge of workstations, Windows NT server and workstation software, and network component installation. This guide is intended to supplement (but not replace) installation manuals provided by the vendor of Imaging System components.

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Chapter 1 Introduction

1.1 The **VISTA** Imaging System

The **VISTA** Imaging System V.2.0 is an extension of the Veterans Health Information System Technology Architecture (**VISTA**) hospital information system that captures clinical images, scanned documents, and other non-textual data files and makes them part of the patient's electronic medical record. Image and text data are provided in an integrated manner that facilitates the clinician's task of correlating that data and making patient care decisions in a timely and accurate way.

The system is designed to provide the treating physician with a complete view of patient data, and at the same time allow consulting physicians to have access to that image and text data. It serves as a tool to aid communication and consultation among physicians -- whether in the same department, in different medical services, or at different sites.

The **VISTA** Imaging System is unique in that management of the medical images is an integral part of a hospital information system.

Imaging workstations located throughout the hospital capture and display a wide variety of medical images including:

- cardiology
- bronchoscopy
- GI endoscopy
- hematology
- surgical pathology
- surgery
- dermatology
- radiology images

1.1.1 **VISTA** Imaging System Components

The **VISTA** Imaging System V. 2.0 is composed of a variety of components, including:

- workstation hardware and software
- image producing devices
- magnetic and optical disk servers
- a network which integrates all these components with the **VISTA** Hospital Information System

An overview of the individual components is given below.

Imaging Workstations: The imaging workstation platform is based on Pentium and Pentium Pro (P6) systems containing a PCI video adapter with at least 4 MB RAM, and an optional image capture board. The use of a high-resolution SVGA color monitor allows the simultaneous display of images with clinical text. The workstation meets clinicians' needs for...

- true color displays of up to 16 million colors per pixel to handle pathology, dermatology, and endoscopy images.
- variable spatial and color/grayscale resolution.
- digital image capture on the workstations.

Basic support for even higher resolution (1728x2304) black and white multi-monitor displays for radiology images are also included in the Imaging System V. 2.0.

Local Area Imaging Network: The **VISTA** Imaging System uses a local area network (LAN) to connect imaging workstations to image file servers and to the main **VISTA** hospital information system running M. The local area network uses 10 or 100mbit/s Ethernet in an EIA/TIA 568 Standard Structured Wiring topology. Workstations are normally connected to a concentrator located in the local wiring closet. The concentrators in the wiring closets are connected via fiber optic cable run vertically to the computer room hub. The computer room hub may be a router or Ethernet switch. Each wiring closet concentrator and each server can be connected to a separate Ethernet port on the hub, switch, or router, improving network throughput.

Kernel Broker: The Kernel Broker software allows workstations to connect to the **VISTA** servers using the TCP/IP protocol and retrieve information from the **VISTA** database.

Imaging Servers: All images are stored on file servers that are on a network segment separate from the **VISTA** HIS servers. This ensures that image traffic and volume does not adversely affect the performance of the **VISTA** HIS core systems. Multiple magnetic and optical disk file servers are used to store images.

Magnetic image file servers are used to store the most recently acquired and accessed image files. These are currently based on Alpha or Pentium Pro systems and run Windows NT Server Software. These servers were chosen for their...

- speed
- cost
- simplicity
- ability to support multiple protocols including TCP/IP

- accessibility over wide-area networks and by dial-in

As more images are captured, you may need to move the older images to less expensive storage media. Optical disk jukeboxes suit this purpose.

Imaging 2.0 includes software to manage the automatic migration of files between magnetic and optical disk servers. Write once read many (WORM) jukeboxes provide the least expensive per megabyte costs. The cost of the jukebox storage has been decreasing with technology advances.

Workstation Software: Workstations run the **VISTA** Imaging Display and Capture software. These windows-based applications allow...

- acquisition of images
- linkage with **VISTA** reports
- long-term storage and display

Four **VISTA** packages are currently integrated with images:

- Medicine
- Surgery
- Laboratory
- Radiology

In addition, there is imaging software to support the Integrated Image Display for clinicians, and to provide general utilities. Images and text data are available from medical center workstations to users with **VISTA** -controlled access privileges.

Imaging 2.0 creates a small number of FileMan files on the **VISTA** servers. These files hold image information in M globals, including:

- data type information
- image location
- control information for the imaging software
- image attributes

Windows software running on Imaging 2.0 workstations use this information to access image files and control image display. Imaging 2.0 workstations can also run security and virus protection software.

Instrument Interfaces: Images may be acquired from a number of different sources, including medical devices such as the following:

- endoscopes
- ultrasound scanners
- video cameras which can be connected to microscopes or ophthalmoscopes
- handheld still video cameras
- x-ray scanners

- or interfaces to medical systems, such as Picture Archiving and Communications Systems (PACS) and electrocardiogram systems

Some of these sources can send image data directly to the imaging workstation. Others will require an interface device to communicate with the workstation. Still others communicate with a network system such as a DICOM interface system to transfer images to the **VISTA** Image Servers.

PACS Interface (Not included in Imaging V. 2.0): Several sites within the VA have purchased commercial radiology Picture Archiving and Communications Systems (PACS). A **VISTA** -PACS interface based on the DICOM version 3.0 standard is being implemented and tested at the Boston and West Los Angeles VA Medical Centers, where commercial PACS systems support image acquisition from radiology devices. Bi-directional exchange of images and text is required between the **VISTA** and PACS systems in order to avoid double key entry. Patient identification, demographic data, and order entry information can be transmitted directly from the **VISTA** system, where it originates, to the PACS. Radiology reports can be transmitted to the PACS system for display with PACS images if this is desired. PACS generated information (i.e., exam completion notification) can be sent to **VISTA** in order to update the order status. For sites with the **VISTA** Imaging System, the PACS can send a list of the images associated with each completed order so that these images can be displayed on **VISTA** workstations (PACS images may be reduced in size when they are sent to **VISTA**). The interface is designed to be compatible with other commercial PACS systems.

DICOM is the Digital Imaging and Communications in Medicine standard developed by the American College of Radiologists and the National Electrical Manufacturers Association. The DICOM standard brings open systems technology to the previously proprietary medical imaging market. Commercial pressures require DICOM to be universally supported by all radiology imaging equipment vendors. While earlier versions of the ACR-NEMA standard were originally developed for radiology imaging, this version of the DICOM standard is being adapted and extended to other medical imaging modalities. Currently, the American College of Cardiology, the American Society of Gastrointestinal Endoscopists, the College of American Pathologists, the American Dental Association (ADA), and the American Academy of Ophthalmology are working to include cardiology, endoscopy, pathology, dental and ophthalmology images in DICOM.

As a result of the DICOM standard, **VISTA** can acquire images directly from image capture devices. This capability is currently supported only by Radiology equipment vendors, but is soon to be extended to other image producing specialties as well. Test images have been captured from...

- Fuji CR

- Picker CT and MR
- General Electric CT
- ATL ULTRASOUND.

The DICOM software is entering beta testing at the present time and will be available in a later release.

Utility Workstation: It is currently necessary to have at least one background processor workstation on the network to perform utility functions in the background such as copying image files to and from the Jukebox.

1.1.2 Workstation Placement

Workstations are typically located in a number of departments and patient care areas. Each site must decide where to locate their workstations based on the services that will be using them.

Image input workstation locations may include the...

- cardiology department
- gastroenterology endoscopy lab
- bronchoscopy examination room
- surgical pathology reading room
- hematology laboratory
- dermatology and rheumatology clinics
- emergency room
- operating room
- radiology and nuclear medicine department

Image display workstations should be placed in conference areas, including...

- the auditorium
- service conference rooms
- ward conference areas

As well as patient treatment areas on...

- wards
- clinics
- emergency room
- intensive care units

A larger monitor or projector should be used in conference areas. An image printer can be located in the medical media department, or another convenient location. Images are generally collected by consulting services to meet their own needs, as well as the needs of the referring physicians.

A medical center may want to incrementally build their imaging system, serving a subset of medical services in the beginning and increasing the number of

workstations gradually. There are clusters of services that see the same patients and need to share images to provide treatment. They often hold joint conferences weekly. Workstations will be best utilized if they address the needs of such clusters. Generally, all services need access to radiology images.

1.1.3 System Utilization Studies

In order to collect cost/benefit information, the **VISTA** Imaging Project is logging a number of usage statistics. This information also provides valuable feedback to the system developers and Information Resources Management (IRM) support staff. It may help determine the need for additional user training in particular areas or to assist in decisions related to the location of imaging workstations.

1.1.4 Summary

The **VISTA** Integrated Imaging System has been received very well by its users, and serves as an incentive for clinicians to use the hospital information system. The Imaging System is meeting real needs for integrated image and text data that cannot be met in other ways.

1.2 Site Requirements for Use of the VISTA Imaging System

1.2.1 Package Requirements

The **VISTA** Imaging System is designed to be used in conjunction with the following **VISTA** packages:

- Kernel V. 8.0
- FileMan V. 21
- Medicine V. 2.3 (need patches MC*2.3*6, MC*2.3*7 ,MC*2.3*9 and MC*2.3*11)
- Laboratory V. 5.2 (need patch LR*5.2*121)
- Radiology V. 4.5 (need patch RA*4.5*11)
- Surgery V. 3.0 (need patch SF*3*66)
- Kernel Broker V.1.0
- Health Summary 2.7
- PIMS V. 5.3 (need patch DG*5.3*124)

The patches for Laboratory and Radiology may need to be obtained from the developers.

1.2.2 User Access to Workstation

Access to the workstations must be restricted in order to prevent...

- modifications to the workstation setup, files, and directory structures.
- filling of the disk with extraneous software and Internet files.

Methods are described in Appendix D and the Imaging Security documentation.

1.2.3 Staffing Requirements

VA staffing guidelines recommend that a network of 50 workstations should have one FTEE to manage the workstations; a full time network manager may also be needed. An imaging network is similar. We have found that at least one FTEE is needed for a 50-workstation network. A site with fewer workstations and servers may be able to reduce this to a minimum of one half FTEE. The Imaging System manager will need to be familiar with PC hardware, software, setup, and troubleshooting. This individual should also be familiar with Windows NT and M. There is training available commercially in these areas.

It is very important to have clinical ADP support staff to assist users in interfacing video devices and other systems to the imaging workstations and network. They will need to provide training to clinicians using the system, especially during the first year of operation. At smaller imaging system installations, a single individual with appropriate background could both support the network and serve as the clinical ADP support person.

1.2.4 Contractors' Services

It is essential that sites provide maintenance on imaging components. Maintenance contracts provide this service with the minimum of VA staff time. VA staff will still need to be familiar with common problems. However, once the problem is identified, its resolution should become the contractor's responsibility.

It is important to have a "hot spare" workstation available at all times. Imaging workstations are used during medical procedures and clinical conferences. If a workstation is not available, this will interfere with the delivery of clinical care. This requires that IRM be ready to attend to trouble calls from imaging users immediately.

IRM services should also consider contracting for installation of software such as Windows NT. In many cases, the network operating system can be installed before delivery. It is also possible to purchase expertise in network installation, configuration, and maintenance. If this is done, be sure to require network documentation from the contractor.

1.2.5 Imaging System Approved Components

The **VISTA** Imaging System consists of a group of off-the-shelf components that are integrated to create a unique system. Some of these components are on the cutting edge of technology. For some components, there are many variations available in the market place. However, each variation has subtle differences that may not be known to their vendors.

Therefore, the **VISTA** Imaging staff has carefully tested equipment and software that we recommend to be sure it meets our requirements, and to determine a configuration to best allow integration with other components. We maintain a list of tested and supported equipment (see the Appendix of Technical Manual), and require that sites use equipment from this list to receive VA support. If a site decides to purchase different hardware or software, they must take responsibility for making their equipment work together.

Note: All equipment for use with the VISTA Imaging System must meet specifications defined by the VISTA Imaging Project Team. Please see the VISTA Planning Document and Approved Equipment List.

Users may ask to run other software on an imaging workstation. For support and security reasons, we recommend some limitations on user access to the workstation. In any case, a site may choose to restrict its users from running other software, such as word processing, if this is felt not to be a cost-effective use of the imaging equipment.

1.2.6 Reporting Problems

The Imaging System is a complex system. If you encounter problems, please document them in a mail message and send to G. IMAGING DEVELOPMENT TEAM on FORUM. Also, please call your Support Team to report the problem and receive help.

1.3 Imaging System Evolution

1.3.1 Introduction

A hospital imaging system can be implemented at one time or incrementally over a period of time. Even if equipment is purchased and installed at one time, it is best to gradually add users and service functionality to the system. It takes time for the IRM staff to be trained and gain experience in how to support imaging technology. Also, it takes time for the initial users of the system to become comfortable enough with the applications to use them during procedures and conferences. Devices within services will need to be connected to workstations. Clinical advocates, or

ADPACS, are very helpful in bringing together clinical image users and IRM staff to implement the capture of new image types. This is exciting and rewarding but does require effort on the part of IRM.

Begin by identifying an initial group of users who would share images. There are clusters of services that see the same patients and need to share images to provide treatment. For example, the G.I. endoscopy lab may examine a patient and perform a biopsy. The specimen is then sent to the laboratory service. The pathology report may indicate that surgery is necessary. Typically, these three services hold a weekly conference where they plan treatment for patients. Another group is those services participating in Tumor Board Conferences. Workstations will be best utilized if they address the needs of such clusters. Select such a cluster as the starting point.

The G.I., surgical pathology, and surgery services are excellent candidates for initial users for the Imaging System. Workstations would be placed in the following areas:

- G.I. endoscopy suite
- Surgical pathology office
- Conference rooms
- Operating room suite (tentative)

Generally, all services need access to radiology images, so radiology could come next. Other ancillary services could follow.

Imaging workstations should be installed where they will be most beneficial. It is useful to differentiate between those workstations that are used to capture images and those workstations that are used predominately to display images. Image capture workstations are placed near the source of the images, while image display workstations should be located in common areas (e.g., conference rooms, ICUs, shared ward offices, etc.). If there are a small number of imaging workstations, use more for image capture and fewer for display. If there are a large number of imaging workstations, use more for display.

As imaging systems grow, they require...

- Expanded network capacity
- Additional image file server space
- A bigger optical disk jukebox
- Additional IRM management

1.3.2 Network Topology Requirements

Contact the VA Data Networks Division when planning a network architecture for your site. Be sure to send a copy of any draft plans to the imaging team for review.

A small Imaging System, with a handful of workstations and one file server, needs only a single-level star network topology using an Ethernet switch. Each of the workstations would be connected directly to a switch port. The server would be connected to another switch port. The main hospital computer would also connect to a switch port. This network would have only one logical Ethernet segment that would be sufficient to handle the expected traffic.

A larger imaging system would require a hierarchical networking topology. The workstation is connected via Category 5 UTP horizontal wiring to concentrators in the wiring closets. The concentrators in the wiring closets would be connected via fiber optic cable vertical wiring to the central hub in the computer room. The network would be partitioned into several separate segments, using either a router or a switch in the computer room as the central hub. Each of the workstation segments and each of the file servers would be connected to a separate port on the central computer room hub. An additional port would be connected to the main hospital computer to carry the TCP/IP kernel broker requests.

The physical cabling of the imaging network should follow recommendations of the VA's Telecommunications Task Force ("DHCP Facility Data Communications Cabling Recommendations and Implementation Strategies", 9/30/91, Revised 1/20/92, David Bradley, Chair), and use the ANSI/TIA/EIA 568 Commercial Building Telecommunications Wiring Standard.

1.3.3 File Servers and Jukebox Requirements

In order to estimate file server and jukebox requirements, it is important to consider image file size and image acquisition rates. Further information to assist you in selecting appropriate hardware can be found in the **VISTA** Imaging System Planning Document.

1.3.4 Future Plans for the Imaging System

Imaging system technology is new, complicated, rapidly improving, and now affordable. PC processor and magnetic disk technology seems to double, in both speed and capacity, every two years. Ethernet has made an order of magnitude leap to 100 Mbits/second. High-resolution diagnostic quality 2k x 2k display drivers and grey-scale monitor technology is now available for PCs. A standard for optical disk technology (ECMA 167) covering directory and file formats has been approved. Jukebox hardware/software technology is becoming more available at more reasonable prices. The DICOM standard that is well established for radiology equipment is being adopted by the other members of the medical imaging community. Off-the-shelf software is available for many image-related functions. All of these factors work to favor the incremental construction of the Imaging System that is being described here.

The following list describes several major development efforts underway within the Imaging Project.

- The new Windows version of Imaging will be further enhanced to provide more features for the multimedia patient record. There will be more options to allow customized views and additional linkages between images and text. Additional types of data will be supported.
- Electrocardiogram data will be viewable on clinical workstations.
- Document management is an area of development that will make use of Windows tools. A number of sites are interested in document imaging for medical records, clinical diagrams, or administrative applications.
- Another development effort is to interface directly to radiology devices using DICOM 3.0 and to support high-resolution display monitors. High-speed network support must be provided. This will allow the VA to construct a subset of PACS capabilities within **VISTA** for sites unable to afford complete commercial systems.
- Enhancements will be made to facilitate the viewing of images stored at another site.

Chapter 2 **VISTA** Imaging System Installation

This chapter describes the installation process for the **VISTA** Image System. The following components will be installed:

- Windows NT Image Server for storage of images
- **VISTA** Hospital Information System Image Management Software
- Imaging workstation software
- Background Processor system and software
- Windows NT OTG Jukebox Software

Please refer to the Imaging Planning Document and Approved Equipment List for information about sizing and procuring equipment.

2.1 Assumptions

Working knowledge of Windows NT and Windows 95.

2.2 Imaging File Server Setup

2.2.1 Install and Configure Windows NT Server Software

At the time of this writing, the VA Naming Conventions document recommends that each site have only one resource domain and all servers should be configured as a member of the resource domain. However, with the limitations of the 16-bit environment (released version 1.0 of the Kernel Broker), the imaging system can not be configured as part of the local site resource domain if it is to maintain a high level of security and protect unwanted access to patient's images. The next release of imaging software will be converted to 32-bit(s) and will allow imaging file servers to participate in the local resource domain.

Considering the aforementioned facts, there are two (2) options for the image server configuration.

1. Configure each server as a standalone server (not as a Primary Domain Controller (PDC) or a Backup Domain Controller (BDC)). This option will make it easier for a site to configure the servers to participate in the local resource domain in a future version of the imaging system and is what the imaging development team recommends. They will not have to reload the NT operating system in order to demote the servers from a PDC or BDC to standalone servers. The down side is that you will have to administer users and groups separately on each server. Usually, you will only need to create 2 user accounts and groups on each server, so this is not a big problem unless you have many servers.

2. Configure the imaging servers in a standalone domain with one server configured as a Primary Domain Controller (PDC) and the remaining servers configured as Backup Domain Controllers (BDCs). If you are using NT clustering, the servers in the cluster cannot be configured as PDCs or BDCs. They must be configured as standalone servers. They can participate in the domain if you choose the second option.

Note the following information:

- See Appendix A for a detailed example of how to install Windows NT software.
- You will configure the imaging servers in a workgroup if they are configured as individual servers. If you are configuring a standalone domain, you will need a domain name.
- Recommended Image workgroup or domain name:
VHA + 3-letter site name + IMG
i.e., VHAWASIMG or VHAWIMIMG
- Recommended Image Server name:
VHA + 3-letter site name + IMM + 1 digit (sequential)
i.e., VHAWASIMM1 or VHAWIMIMM1
- Recommended Cluster Name: (only if you are using NT clustering)
VHA + 3-letter site name + CLU + 1 digit (sequential)
i.e., VHAWASCLU1

Note: If you are not configuring the Imaging servers in a domain, skip to Section 2.2.3.

2.2.2 Domain Configuration

Review the following information on domain configuration:

- If you are using NT Clustering software, you should create a PDC and a BDC that is not part of the cluster. Then, configure your cluster servers as regular NT servers (not a PDC or BDC) and add them as members of the Imaging domain.
- If you are not using NT Clustering software, configure one server as a Primary Domain Controller (PDC) and all other image servers as Backup Domain

Controllers (BDCs)).

2.2.3 Domain Trusts

Review the following information on domain trusts:

- In order to maintain a high level of application security and to protect unwanted access to patients' images, the Imaging servers should be configured as a stand-alone resource. Do not use trusts to any other domain at this time.
- All imaging users will log into the master domain for their site or VISN as vhaimageuser. Consult your VISN domain document for more detailed information. Image directories will be accessed through shares.
- Since the imaging servers do not have a trust to any other domain, you must add your imaging users to each image server or domain. A site will typically have one generic imaging user, and one imaging administrator configured on the server.

2.2.4 Creating Imaging Users and Groups

Follow these steps to create imaging users and groups:

1. Setup users and groups. If your servers are not configured as a domain, you must administer users and groups on each of the servers. Otherwise, you can add users to any of the servers in the domain.
2. Create a local group called ISW Image Users where ISW is an example of your assigned 3-character site name.

Policies/User Rights for the Image Users group

- Access this computer from network.
3. Create a generic user called **vhaimageuser** and add the user(s) to the newly-created group. Refer to Section 2.2.4.2 for information on setting up the vhaimageuser account characteristics.

Properties

- User cannot change password.
 - Password never expires.
4. Assign the vhaimageuser a password that will not be known by any users of the system. All users will logon with the generic vhaimageuser account and a different password that must be created on your master domain server at the site or VISN.

5. Create an vhaimageuser account on the master domain at the site or the VISN domain. The password must be different than the one created on the Image servers. Refer to the Security section for details.

Note: Creating the imageadmin account and group (below) is only necessary if you do not want to give the Administrator account password or Administrator access to the users that will be responsible for managing the imaging file servers.

6. Create a local group called **ISW Image Administrators** where ISW is an example of your assigned 3-character site name.

Minimum Policies/User Rights for the Image Administrators Group

- Access this computer from network
 - Backup files & Directories
 - Restore files & Directories
 - Logon Locally
7. Create a generic user called **imageadmin** and add the user to the newly created group. Set the imageadmin account characteristics as follows:

Properties

- User can not change password
- Password never expires

Note: If you want imageadmin user to have full privileges, add the user to the Administrators group.

2.2.5 Creating Directories and Shares

Follow these steps to create directories and shares:

1. Create an IMAGE directory that will contain all of your captured image files on the NT file server. We recommend having your images stored on a separate partition or disk than your NT operating system files to make it easier to recover from a corrupted partition.
2. If you divided your drive into multiple partitions, create an image directory on each of the partitions.
3. Share the newly created image directory / directories as imagen\$, where n is a sequential number beginning with 1 (e.g., image1\$ for the first partition, image2\$ for the second partition, etc.). Use the following share and directory permissions:

Share Permissions

ISW Image users, ISW Image Administrators, Administrators - full control

(Note: ISW is an example of the 3-character assigned site name)

Directory Permissions

ISW Image Users - add, read

(Note: ISW is an example of the 3-character assigned site name)

ISW Image Administrators - full control

Administrators - full control

Note: The \$ at the end of imageshare makes it a hidden share - it will not show up in the browse list.

4. Optionally, create and share a DISTRIB directory that will contain all of the workstation installation programs. You can use this directory as a central location to load all of your workstations. Use the following share and directory permissions:

Share Permissions:

ISW Image Administrators - full control

Administrators - full control

Directory Permissions:

ISW Image Administrators - full control

Administrators - full control

(Note: ISW is an example of the 3-character assigned site name)

Copy all of the imaging distribution programs to the DISTRIB directory on the server.

2.2.6 Server Security

There are several ways to administer security on the servers. Review the following information:

1. At a minimum, you should check the number of shares that are being advertised from the server and be sure that the correct access privileges are given to shares and directories. This will prevent unauthorized access to files on the server.

2. Be sure to change any default account passwords such as guest and administrator. Virus protection software should also be installed on the servers to protect imaging file servers against viruses.

2.3 VISTA M Server Setup

2.3.1 Software Setup-KIDS Installation, Device Setup, M File Setup

2.3.1.1 Kernel Broker Installation

Follow these steps to install the Kernel Broker:

1. If you do not already have the Kernel Broker software installed on your M system, use KIDS to install XWB1_x.KID (see broker documentation for details).
2. In the VAH UCI of your production account, the M system where you want Imaging workstations to login, use the M command `D STRT^XWBTCP(9200)` to start the broker listener job.
3. You will need to add this to your M system startup file if you want this to start each time you reboot your M server(s).

2.3.1.2 Loading Imaging Package - Kids Installation

The Imaging System files and routines are distributed as a KIDS package named MAGV2O.KID. Follow these steps to load the Imaging Package and install KIDS:

1. Copy the file MAGV2O.KID to a directory on your M Server Computer.
2. Log into the system.
3. Run the Kernel Installation & Distribution System Option.

The following is a screen capture of the Kernel Installation & Distribution System Option.

```
Select OPTION NAME:  Kernel Installation & Distribution System

      Edits and Distribution ...
      Utilities ...
      Installation ...

Select Kernel Installation & Distribution System Option: Installation

  1      Load a Distribution
  2      Verify Checksums in Transport Global
  3      Print Transport Global
  4      Compare Transport Global to Current System
  5      Backup a Transport Global
  6      Install Package(s)
          Restart Install of Package(s)
          Unload a Distribution

Select Installation Option: 1 Load a Distribution
Enter a Host File: MAGV2_0.KID

KIDS Distribution saved on Jan 15, 1997@09:06:27
Comment: IMAGING WINDOWS ROUTINES

This Distribution contains Transport Globals for the following Package(s):
      IMAGING 2.0

Want to Continue with Load? YES// <RET>
Loading Distribution...

Want to RUN the Environment Check Routine? YES// <RET>
      IMAGING 2.0
Use INSTALL NAME: IMAGING 2.0 to install this Distribution.

  1      Load a Distribution
  2      Verify Checksums in Transport Global
  3      Print Transport Global
  4      Compare Transport Global to Current System
  5      Backup a Transport Global
  6      Install Package(s)
          Restart Install of Package(s)
          Unload a Distribution

Select Installation Option: Install Package(s)

KIDS 8.0

Select INSTALL NAME: IMAGING 2.0           Loaded from Distribution

This Distribution was loaded on Mar 06, 1997@17:58 with header of
LATEST IMAGING WINDOWS ROUTINES 1/15/97 ;Created on Jan 15, 1997@09:06:27
It consisted of the following Install(s):
IMAGING 2.0

Install Questions for IMAGING 2.0

Incoming Files:

      2005      IMAGE

      2005.02    OBJECT TYPE  (including data)

      2005.03    PARENT DATA FILE  (including data)
```

```
2005.1      IMAGE AUDIT

2005.15     IMAGE TELECONSULT

2005.2      NETWORK LOCATION

2005.4      IMAGE HISTOLOGICAL STAIN  (including data)

2005.41     MICROSCOPIC OBJECTIVE  (including data)

2005.81     MAG DESCRIPTIVE CATEGORIES

2006.03     IMAGE BACKGROUND QUEUE

2006.031    IMAGE BACKGROUND QUEUE POINTER

2006.032    JUKEBOX FILE

2006.1      IMAGING SITE PARAMETERS

2006.18     IMAGING USER PREFERENCE

2006.19     IMAGING USERS  (including data)

2006.8      IMAGING WORKSTATIONS

2006.81     IMAGING WINDOWS WORKSTATIONS

2006.95     IMAGE ACCESS LOG
```

```
Want to DISABLE Scheduled Options, Menu Options, and Protocols? YES// NO
Want to MOVE routines to other CPUs? NO// <RET>
```

```
Enter the Device you want to print the Install messages.
You can queue the install by enter a 'Q' at the device prompt.
Enter a '^' to abort the install.
```

```
DEVICE: HOME// <RET>
```

```
Install Started for IMAGING 2.0 :
      Mar 06, 1997@17:59:29
```

```
Installing Routines:.....
      Mar 06, 1997@17:59:39
```

```
Running Pre-Install Routine: ^MAGIPRE.
DD(2005,) is deleted
^MAG(2005.02, and DD is deleted
^MAG(2005.03, and DD is deleted
DD(2006.1,) is deleted
```



```

^MAG(2006.19, and DD is deleted
DD(2005.2,) is deleted
DD(2006.8,) is deleted

      DONE CLEANUP!

Installing Data Dictionaries: .....
      Mar 06, 1997@17:59:52

Installing Data:

Installing PACKAGE COMPONENTS:

Installing SECURITY KEY...

Installing REMOTE PROCEDURE.....

Installing OPTION..
      Mar 06, 1997@17:59:59

Updating Routine file.....

Updating KIDS files.....

IMAGING 2.0 Installed.
      Mar 06, 1997@18:00:03

```

2.3.2 Device Setup

Follow these steps to set up the devices:

1. Add a terminal type to the Terminal type file (3.2) with the following characteristics:

```

NAME: P-WORKSTATION          SELECTABLE AT SIGN-ON: NO
RIGHT MARGIN: 80             FORM FEED: #
PAGE LENGTH: 24              BACK SPACE: $C(8)
CLOSE EXECUTE: D CLOSE^MAGGTU5

```

2. Add the Workstation Broker and Broker Device to the Device file (3.5) with the following characteristics:

Workstation Broker (VMS systems only)

```

NAME: WORKSTATION BROKER      $I: WS.DAT
ASK DEVICE: NO                ASK PARAMETERS: NO
LOCATION OF TERMINAL: BROKER
OPEN PARAMETERS: (NEWVERSION,DELETE)
SUBTYPE: P-WORKSTATION        TYPE: HOST FILE SERVER

```

Broker Device (VMS systems only)

NAME: BROKER DEVICE	\$I: _BG
ASK DEVICE: YES	SIGN-ON/SYS DEVICE: YES
LOCATION OF TERMINAL: SYSTEM	*MARGIN WIDTH: 80
*FORM FEED: #,\$C(27,91,50,74,27,91,72)	
*PAGE LENGTH: 24	*BACK SPACE: \$C(8)
SUBTYPE: C-VT100	TYPE: VIRTUAL TERM

Workstation Broker (Open-M systems only)

NAME: WORKSTATION BROKER	\$I: WS.DAT
ASK DEVICE: NO	ASK PARAMETERS: NO
LOCATION OF TERMINAL: BROKER	DEFAULT SUBTYPE: P-WORKSTATION
*MARGIN WIDTH: 80	*FORM FEED: #
*PAGE LENGTH: 24	*BACK SPACE: \$C(8)
OPEN PARAMETERS: "NWS"	SUBTYPE: P-WORKSTATION
TYPE: HOST FILE SERVER	

Broker Device (Open-M systems only)

NAME: BROKER DEVICE	\$I: _BG
ASK DEVICE: YES	SIGN-ON/SYSTEM DEVICE: YES
LOCATION OF TERMINAL: SYSTEM	DEFAULT SUBTYPE: C-VT100
*MARGIN WIDTH: 80	*FORM FEED: #,\$C(27,91,50,74,27,91,72)
*PAGE LENGTH: 24	*BACK SPACE: \$C(8)
*BLINK ON: \$C(27,91,53,109)	*BLINK OFF: \$C(27,91,109)
SUBTYPE: C-VT100	TYPE: VIRTUAL TERMINAL

Broker Device (MSM systems only)

NAME: BROKER DEVICE	\$I: 56
ASK DEVICE: NO	ASK PARAMETERS: NO
LOCATION OF TERMINAL: RPC BROKER	*MARGIN WIDTH: 80
*FORM FEED: #,\$C(27,91,50,74,27,91,72)	
*PAGE LENGTH: 24	*BACK SPACE: \$C(8)
SUBTYPE: C-VT100	TYPE: NETWORK CHANNEL

Workstation Broker (MSM systems only)

NAME: WORKSTATION BROKER	\$I: 51
ASK DEVICE: NO	ASK PARAMETERS: NO
LOCATION OF TERMINAL: BROKER	*MARGIN WIDTH: 80
*FORM FEED: #	*PAGE LENGTH: 24
*BACK SPACE: \$C(80)	MNEMONIC: WORKSTATION
OPEN PARAMETERS: ("WS.DAT": "M")	SUBTYPE: P-WORKSTATION
TYPE: HOST FILE SERVER	

2.3.3 Imaging M File Setup

The following topics relate to initializing the Imaging M (also known as MUMPS) files.

2.3.3.1 Edit the Network Location file (2005.2)

All file server directories to be used by the Imaging System for storing images must be listed in the Network Location file. Each one is assigned a logical name. Magnetic server directories begin with “MAG”. Write once, read many (WORM) optical devices should start with “WORM”.

Add an entry for MAG1. The physical reference should point to your file server's image share

i.e. \\VHAISWIMMn\image1\$\ (\server name\share name\)

If you created multiple partitions, add an entry for each of the other drives.

Note: It is important that each physical reference entry in the network location file end with a “\”.

The following is a transcript of a Network Location edit session using the MAG SYS MENU option (Note: this option requires the MAG SYSTEM key):

```
Select Imaging System Manager Menu Option: NT Enter/Edit Network Location
Enter a Network Location: MAG1
ARE YOU ADDING 'MAG1' AS A NEW NETWORK LOCATION (THE 1ST)? Y (YES)
NETWORK LOCATION PHYSICAL REFERENCE: ??
This is the physical network location where the image is stored.
This is the UNK name for the Image Storage.
For example: \\WASIMG01\image\
NETWORK LOCATION PHYSICAL REFERENCE: \\VHAWASIMM01\image1$\ (ENTER YOUR SERVER AND
SHARE NAMES HERE)
NETWORK LOCATION STORAGE TYPE: ??
This field describes the media type of this network
It should be MAGNETIC for a magnetic disk server. Jukeboxes should be
WORM-DG for Data General Jukeboxes under Open Networkware or WORM-PDT
for Pegasus Jukeboxes or WORM-OTG for OTG Disk Extender.
WORM-DG and WORM-PDT are for backwards compatibility only.
Note: WORM stands for Write Once, Read Many)
or READ/WRITE.
CHOOSE FROM:
MAG MAGNETIC
WORM-DG WORM-DG
WORM-PDT WORM-PDT
RW READ/WRITE
WORM-OTG WORM-OTG
STORAGE TYPE: MAG MAGNETIC
NETWORK LOCATION: MAG1// <RET>
STORAGE TYPE: MAGNETIC// <RET>
OPERATIONAL STATUS: 1//?
Code the Network Location Online/Offline status
```

```
CHOOSE FROM:
0           OFFLINE
1           ONLINE
OPERATIONAL STATUS: 1// <RET>  ONLINE
PHYSICAL REFERENCE: \\VAHWASIMM1\image1$\ <RET>
```

Note: For jukebox network locations, see the section on Jukebox Installation.

2.3.3.2 Edit the Imaging Site Parameter file

On the Imaging System Manager's Menu, there is an option which allows you to define the Imaging Site Parameters. Online help is available by responding to the fields with "?".

The following example is a transcript of the Imaging Site Parameter edit session using the MAG SYS MENU option. This menu requires the MAG SYSTEM key (Please note that the .01 field, NAME, is not one of the editable fields on the following example.). Following the example text (below), there is an explanation of the most important Imaging Site Parameter fields.

```
Select Imaging System Manager Menu Option: DS  Define Imaging Site
Parameters

INITIAL NAMESPACE: I2// <RET>

IMAGE NETWORK WRITE LOCATION: MAG100// <RET>

PACS INTERFACE SWITCH: ON PACS INTERFACE// <RET>

PACS DIRECTORY: <RET>

PACS IMAGE WRITE LOCATION: <RET>

PACS ACCESS DAYS DELETE CUTOFF: 30// <RET>

TRACK ABSTRACT ACCESSES: YES// <RET>

DAYS SINCE LAST ACCESS CUTOFF: 90// <RET>

NET PASSWORD: <Hidden>// <RET>

DEFAULT USER PREFERENCE: <RET>

USE CAPTURE KEYS: TRUE// <RET>

JUKEBOX DEFAULT: <RET>
```

Note: The PACS fields prompts will not display unless you have a PACS

system installed and the ^MAGDHL7 global exists.

Important Imaging Site Parameter Fields:

NAME: **WASHINGTON**

This is the institution/facility name for which these site parameters apply. When using the "Define Imaging Site Parameters" option, the name for your facility is taken from the Kernel Site Parameters file and automatically defined as the name (.01) field for this file. This field is only editable using FileMan. However, it is important to populate the Network Location first, before undertaking this one. The fields contained in this file are those that are site specific - differ from site to site.

This file can have only one entry.

INITIAL NAMESPACE: **W1**

Answer must be two characters in length. This field is automatically assigned.

(Note: File 2006.19, Imaging Users, contains the assigned namespace for all medical centers)

ATTENTION: If you are installing the Imaging System in the live account and the test account, you must have a different namespace for the test account. You can use Z1 for your test account namespace.

IMAGE NETWORK WRITE LOCATION: **MAG1**

This is the current network location for image storage. All captured image files will be written to this location. This is a pointer to the Network Location File.

TRACK ABSTRACT ACCESSES: **Y**

Enter YES to use abstract accesses in determining archive times.

Choose from:

1 YES

2 NO

This field controls whether user accesses to image abstracts will cause the LAST ACCESS DATE field in the IMAGE file to be updated. The LAST ACCESS DATE field is used to determine when full and abstract images are removed from magnetic disks and become available only from optical disk.

DAYS SINCE LAST ACCESS CUTOFF: **90**

Type a Number between 0 and 999999, 0 decimal digits. All images that have not been accessed in the last X days (where X is the ACCESS DAYS DELETE CUTOFF) will be removed from the magnetic drive during file migration procedures.

NET PASSWORD: **<hidden>**

This field must be set to the NT password for the VHAIMAGEUSER account. It will be encrypted before it is stored in the system (Note: this field will not be echoed when it is typed in).

CAPTURE KEYS:

Setting this field to yes will require assigning Imaging security keys to allow capturing images.

JUKEBOX DEFAULT

Indicate the default jukebox to use, this is a pointer to the Imaging Jukebox file (2006.032).

Additional information regarding this file can be obtained from the Imaging Technical manual.

2.3.4 Assign Imaging Menu Options and Keys

Assign the Imaging menu option (MAG WINDOWS) to anyone who will be using the **VISTA** Imaging capture or display software. If you have programmer access, you do not need this option. The Kernel Broker software bypasses option checking if you have programmer access. Review the Imaging Security and Technical manuals for more information on security keys.

2.4 Imaging Workstation Setup

2.4.1 Overview of Installation of Imaging Workstation Software

Review the following information:

- Please verify that your workstation hardware is currently supported by the **VISTA** Imaging Project (see **VISTA** Imaging Equipment List.)

- There are several steps required to load the operational Imaging System software onto the workstations.
 - a. Load Windows 95 or Windows NT workstation software.
 - b. Install Kernel Broker client software.
 - c. Install **VISTA** Imaging workstation software.
 - d. Setup workstation default parameters in MAG.INI file.
 - e. Install security and virus protection software.

2.4.2 Load Windows 95 or Windows NT Workstation software

Install Windows 95 or Windows NT workstation and configure the TCP/IP protocol. More detailed information on how to install Windows 95 and Windows NT Workstation is provided in Appendix B and C.

2.4.3 Install RPC Broker Client Software

Follow these steps to install the RPC Broker Client software:

1. Login to workstation as **imageadmin** or **administrator**
2. Connect to the \DISTRIB directory of the server either by mapping a drive or browsing through network neighborhood.
3. Install the RPC Broker client manager software.
 - Run XWB1_x.EXE and follow setup wizard. When prompted, edit hosts. file and add an entry for DHCPSEVER. This should point to the **VISTA** system where the broker server process is running.

Sample Hosts file entry:

```
#hosts

152.128.1.14 DHCPSEVER

#end hosts
```

Note: A single space should separate IP address and alias. You should also have a blank line (LF) at the end of the file.

- Run the Kernel Broker EGCHO Test.

Egcho.exe is a test program distributed and installed on your PC in the C:\VISTA\BROKER directory when the Kernel Broker Client

Software is installed. When executed, it can be used to test the connection to the **VISTA** System. This is valuable in troubleshooting problems with Imaging 2.0. Please review the Kernel Broker documentation for more information and examples on the EGCHO test application.

2.4.4 Install the VISTA Imaging Workstation software

Installation will require between 40mb and 70mb of space on the workstation depending on whether you install the sample images. This is the recommended procedure:

1. Run MagSetup.exe from the DISTRIB directory on the server. Use all of the defaults.
2. If you want demo images on the workstation, run the MagImage.exe program. These are useful for testing and demonstrating the capabilities of the Imaging Display software. It is recommended that images be loaded.
3. If you want to enable viewing of images at remote sites, you will have to make some changes to your VISTA.INI and HOSTS files.
 - Load the VISTA.INI file in an ASCII editor such as Notepad. In the section [RPCBroker_Servers], enter the names of the different sites to which this workstation will be connected (Create this section if it doesn't already exist).

The following is a sample VISTA.INI file that will allow the user to connect to four sites:

```
[RPCBroker]
HostsPath=C:\WINDOWS
ClientManagerPath=C:\vista\Broker
IdeConnect=1
ErrorRetry=0
ClearParameters=1
ClearResults=1
ListenerPort=9200
Server=dhcpserver
ClientManagerState=1

[RPCBroker_Servers]
1=WASHINGTON-LIVE,9200
2=boston-live,9300
3=boston-test,9200
4=baltimore,9200
```

- You must start the first entry with “1=...”, the second with “2=...”. (do not skip any numbers). The “9200” that follows the name, is the Kernel Broker LISTENER port number. See the Kernel Broker installation documentation

on how to select a port.

- For each entry in the [RPCBroker_Servers] section, you must have an entry in the "HOSTS." file. Below is an example of the part of the hosts file that corresponds to the above entries in the [RPCBroker_Servers] section.

#HOSTS	
152.128.12.44	WASHINGTON-LIVE DHCPSEVER
152.128.11.23	boston-live
152.128.32.29	boston-test
152.128.189.92	baltimore
#END	

2.4.5 Autoupdating the Imaging Application

The autoupdate feature of the Imaging application allows the automatic installation of new versions of the workstation software. When configured, it will ask the user if they want to install the new version (if it exists on the network). They have the option of continuing with the install or canceling to remain using the older version.

Note: Windows for Workgroups, Windows 3.1 -- see special note at end.

2.4.5.1 Steps to Enable AutoUpdating on the Workstation

Step 1: Create or identify two network directories that are reachable from Imaging Workstations by Imaging users.

- A test directory

i.e., \\<servername>\<sharename>\UPDATES\TEST

- A distribution directory

i.e., \\<servername>\<sharename>\UPDATES\DISTRIB

The \TEST directory is for imaging updates (new versions of MAGSETUP.EXE) which will be copied here.

Note: Sites should have at least one imaging workstation defined as an Imaging Test Station. The Imaging applications on test workstations must update themselves from the Network TEST directory. After running the imaging applications on the test stations for awhile to insure there are no problems with the imaging update at your site, copy MAGSETUP.EXE into the Distribute Directory(\DISTRIB).

The \DISTRIB directory: The majority of imaging workstations will update themselves from this directory.

Step 2: Copy MAGASET.EXE, MAGNET.INI, and MAGSETUP.EXE to the \TEST Network Directory.

Step 3: Copy MAGASET.EXE and MAGNET.INI to the \DISTRIB Network Directory.

On each imaging workstation:

Step 4: Run MAGASET.EXE from the Network Directory. Use the \TEST directory if this is to be an Imaging Test Workstation or the \DISTRIB directory for a user workstation. MAGASET.EXE will ask if you want to setup the imaging application to autoupdate from this directory; it will display its full path and directory. You must use the format \\servername\directory (NOT driveletter:\directory). The MAG.INI file will be modified by MAGASET.EXE to include the name of the Network directory in the correct section (SYS_AutoUpdate).

Step 5: Run MAGSETUP.EXE from the Network Directory. This will install the latest Imaging files on the workstation.

Now Imaging is setup for AutoUpdating.

Step 6: Whenever you place a new copy of MAGSETUP.EXE in the Network Directory, (either \TEST or \DISTRIB), each Imaging Workstation will prompt the user that “an update to Imaging exists”. The user can click “OK” to run the update or “Cancel” to not run it. If the user clicks “Cancel” and doesn’t run the update, they will be prompted each time Imaging is run with the an “update exists” message, until they run the update.

ATTENTION: As of December 1997, the Imaging team has experienced a problem with user security modifications. If your site

is using desktop security software (i.e., WinShield or NT Policies/Profiles), the Imaging Autoupdate application may cause hidden icons to reappear. Clicking on the visible icon, however, will not produce any results (since the protection remains in place). The Imaging team is attempting to resolve the problem.

Description of Changes to the following files, and addition of new files to enable Autoupdating:

MAG.INI CHANGES

New section [SYS_AutoUpdate]

DIRECTORY=\\<servername>\<sharename>\UPDATES\DISTRIB

ComputerName=GKIRIN

LASTUPDATE=2970521.1659

DIRECTORY: This will list the directory path where the MAGSETUP.EXE file was last executed on this workstation. Sites DO NOT change this entry. This is modified by the Imaging application.

LASTUPDATE: This is the date/time of the MAGSETUP.EXE that was last executed on this workstation. Sites DO NOT change this entry. This is modified by the Imaging application.

New file:

MAGNET.INI

This file has to be copied to the network directory defined by the sites. (See above). It has only one entry for now:

[update_mode]

ForceUpdateAll=FALSE

ForceUpdateAll: This entry will normally be set to FALSE. Reserved for future use.

The imaging application will not run the update if the date of the MAGSETUP.EXE file is equal or less than the LASTUPDATE entry in its MAG.INI file.

VISTA System FileMan File:

IMAGING WINDOWS WORKSTATION

This M file holds information for each workstation on which Imaging is installed. It is updated by the Imaging application (Later versions may have fields that affect the way Imaging functions on each individual workstation).

**** 8-CHARACTER DIRECTORY NAME**

The names of the NETWORK DIRECTORIES that you choose for the AutoUpdating must NOT be longer than 8 CHARACTERS.

\\<servername>\<sharename>\UPDATES\DDISTRIB

i.e., length of "UPDATES" is 7, length of "DISTRIB" is 7

When MAGSETUP.EXE is run on a workstation, it performs two (2) extra tasks.

- It will now read the Network Computer Name (for WINDOWS 95 and NT) and insert that name into the MAG.INI FILE. This Network Computer Name will be used to identify the workstation in the IMAGING WINDOWS WORKSTATION FILE (New **VISTA** Imaging FileMan File).
- It inserts the file date/time of the MAGSETUP.EXE file into the MAG.INI file. This date is used by the Imaging Application to determine if an update needs to be run on this workstation.

SPECIAL NOTE Windows For Workgroups, Windows 3.1

Windows for Workgroups and Windows 3.1 are not recommended for use with Imaging V. 2.0.

The MAGSETUP.EXE file normally reads the Computer Name from the Workstation and enters that name into the MAG.INI file in the Section: [SYS_AUTOUPDATE], entry "ComputerName=".

This DOES NOT work with Windows for Workgroups or Windows 3.1 operating systems. YOU have to enter the Computer Name by HAND into the MAG.INI file.

Example:

[SYS_AUTOUPDATE]

ComputerName=Garrett95

Note: There are no spaces around the "=" sign.

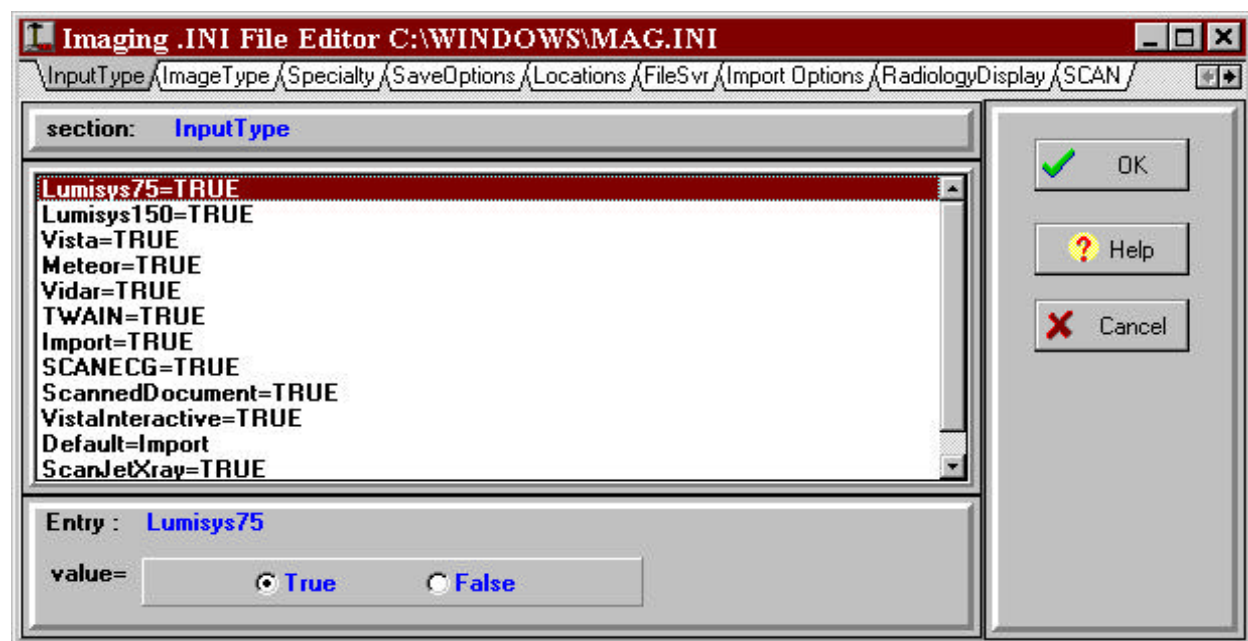
Also, you will be using MAGSET16.EXE, instead of MAGSETUP.EXE, to update the imaging application

2.4.6 Edit the Imaging workstation parameter file with the MAGSYS tool

The MAG.INI file controls many workstation and site-specific parameters for the **VISTA** Imaging System. Run MAGSYS.EXE from the \vista\imaging directory. This tool is meant to assist the system administrator and ADPAC in editing this file.

Description of MAG.INI [sections] and entries

[InputType]	selectable at runtime YES
--------------------	----------------------------------

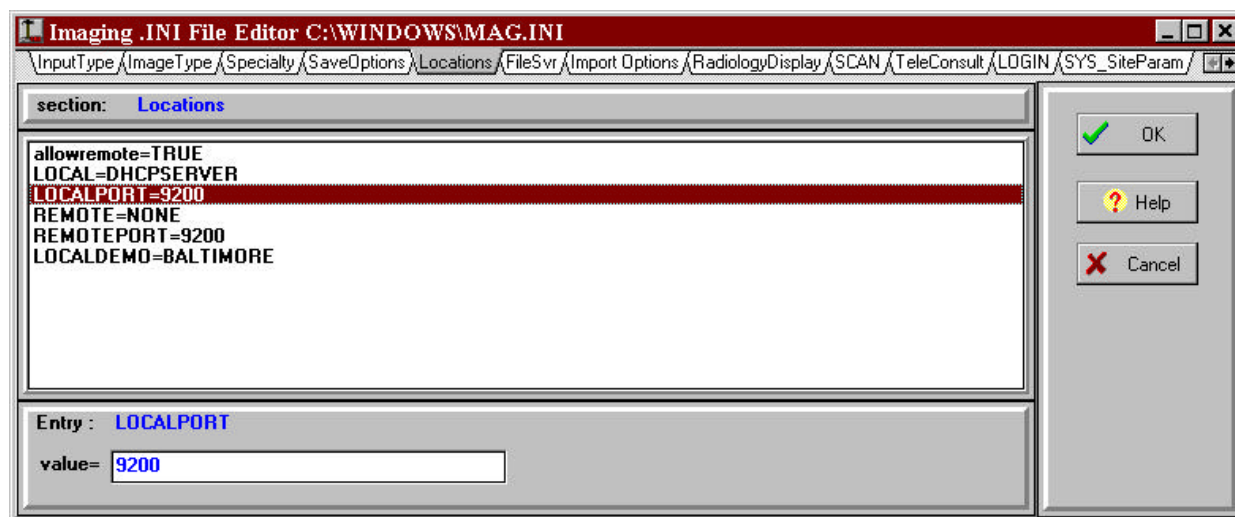


The same software executable file (tele19n.exe) allows many types of image capture. This section of the MAG.INI files controls the input types that are allowed from a particular workstation. The following input types are supported:

- Lumisys 75 X-ray scanner
- Lumisys 150 X-ray scanner
- **VISTA**: Truevision Vista Image Capture Board; used in DHCP Imaging 1.0 workstations.

- VistaInteractive Truevision Vista Image Capture Board. The user will be able to interact with the Vista Board.
- Meteor Video Capture Board with Millenium VGA board
- Vidar-12 X-ray scanner with TWAIN interface
- TWAIN-compliant devices (devices that support a TWAIN interface)
- Import -- Import Mode allows the user to select an image that is residing on a disk on the workstation and import it into the DHCP Imaging System. Three modes of import are supported:
 - “Copy to Server”
 - “Convert to TGA”
 - “Convert File Format to Default”(See the section [Import Options]).
- SCANEKG - Twain device capture of 8-bit Color Images. (256 color)
- ScannedDocument - Twain device capture of 1-bit Document Images.

Each entry has a true/false switch, which controls user access when using Imaging V. 2.0. At least one device **MUST** have “device=TRUE”. The default setting **MUST** be set to something other than NONE. To change values, click on the input type you wish to modify. You will see two radio buttons at the bottom of the window. Select the TRUE or the FALSE button. The value will change in the file, for example, Lumisys75=TRUE. Only those entries set to TRUE are selectable by the user at runtime through the menu option “Options| Configuration”. Do not change the last two enties, Meteor settings and Lumisys100 Film Size

[Locations] selectable at runtime NO

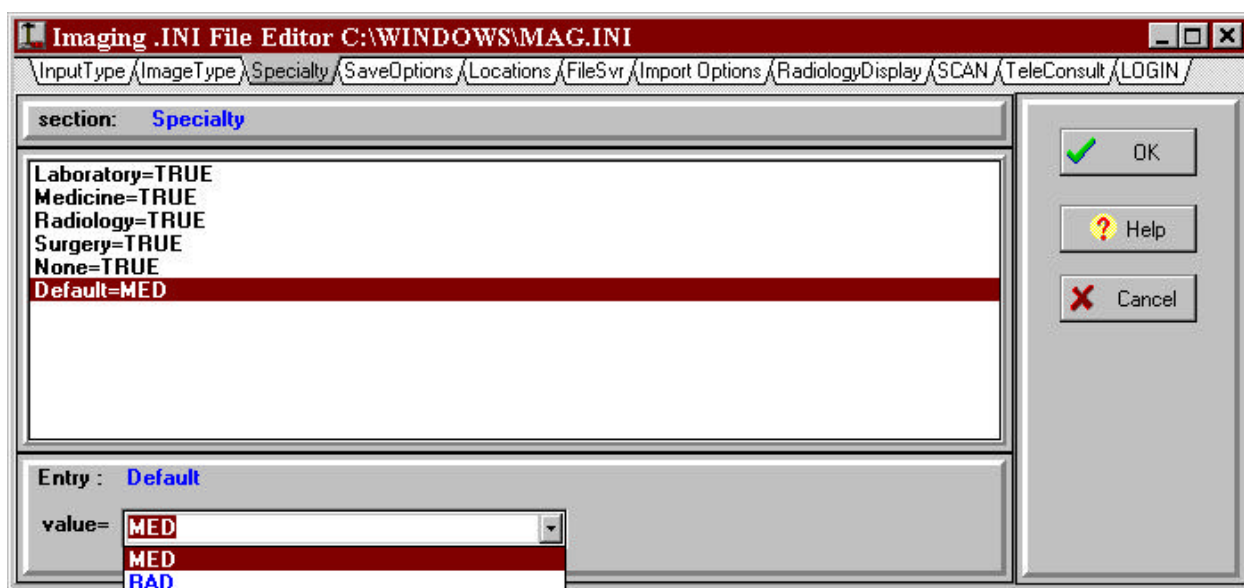
This section controls the two sites that will be able to teleconsult. Teleconsulting means that the image and text data captured will be sent to another VA site. If the patient does not exist in the Patient File at the remote site, an entry will be made and MAS will be requested via mail message to complete the PDX registration process. Entries will be made in the Image File (2005) and the Teleconsultation File (2005.15). Finally, a mail message will be sent to G.IMAGE TELECONSULT (RADIOLOGY), which must be defined at the Local site (sending site) and the remote site (receiving site) where it should contain the consultants and MAS staff at the remote site.

- **LOCAL=DHCPSEVER**, default DHCPSEVER: First, the LOCAL site must be defined. This is the site capturing the images and sending them to the remote site for a consultation. The name typed into the edit box for the local site must match exactly an entry in the workstation's c:\windows\hosts. file.
- **LOCALPORT=9200**, default 9200: This entry refers to the TCP/IP port on the **VISTA** System that the Kernel Broker "listener" process is using. Refer to the Kernel Broker documentation. Usually the port is 9200. If no entry is made, 9200 is used.
- **REMOTE=NONE**, default NONE: Finally, the REMOTE site must be defined. This is the site that will receive the images, and will have entries placed in its Patient, Image, and Teleconsult Files. The name typed into the edit box for the local site must match exactly an entry in the workstation's c:\windows\hosts.

file. If no entry is made, the tele-consult functions of the Imaging System Capture window will be disabled.

- REMOTEPORT=9200, default 9200: This entry refers to the TCP/IP port on the **VISTA** System that the Kernel Broker “listener” process is using. Refer to the Kernel Broker documentation. Usually the port is 9200. If no entry is made 9200 is used.

[Specialty] **selectable at runtime YES**



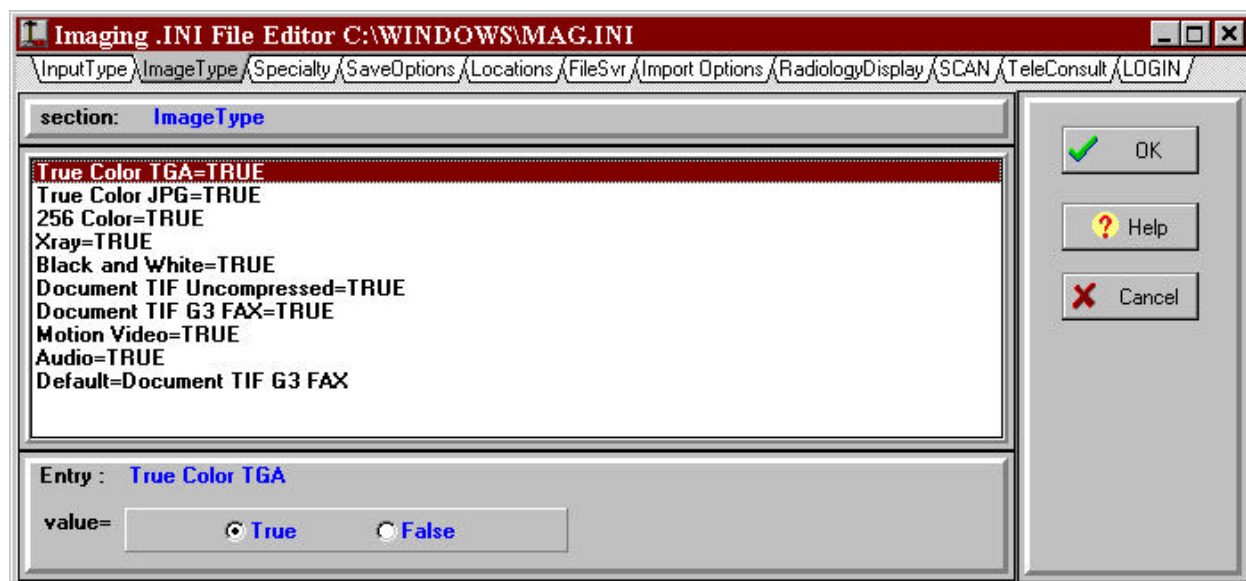
This section of the mag.ini file controls which **VISTA** package the captured image will be associated with and, hence, where the reports associated with the image will be located. Choices include:

- Laboratory (requires version 5.2 patch LR*5.2*72)
- Medicine (requires version 2.2)
- Radiology (requires version 4.5)
- Surgery (requires version 3.0)
- None (allows images that are not linked to a **VISTA** report)

The Default item should be set for the package that is most commonly used for image capture from this workstation. The Image Capture window will be initially configured for the default package when the window is opened. Select the package to be changed from the list box shown by clicking on it. Use the radio buttons at the bottom to select True or False. The Imaging System Capture window user will be able to select from all specialties set to True.

To set the default package, select Default from the list box. Select the abbreviation for the default package from the pull-down list shown below. All entries in the Specialty section have true/false switches. At least one switch must be set to TRUE. Only those entries set to TRUE are selectable by the user at runtime through the menu option “Options | Configuration”.

[ImageType]	selectable at Runtime YES
--------------------	----------------------------------

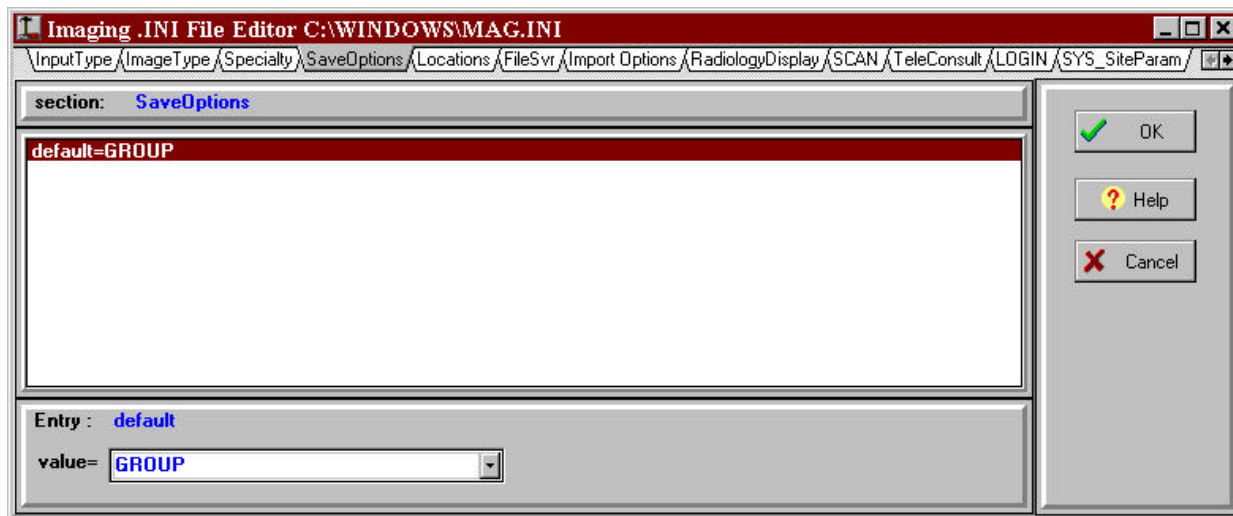


The following is a list of all of the possible image types. All entries in the Image Type section have true/false switches. At least one switch must be set to TRUE, and the default image type can not be set to NONE. Only those entries set to TRUE are selectable by the user at runtime through the menu option “Options | Configuration”.

- True Color TGA=TRUE default FALSE
- True Color JPG=TRUE default FALSE
- 256 Color=TRUE default FALSE
- X-ray=TRUE default FALSE
- Black and White=TRUE default FALSE
- Document TIF Uncompressed=TRUE default FALSE

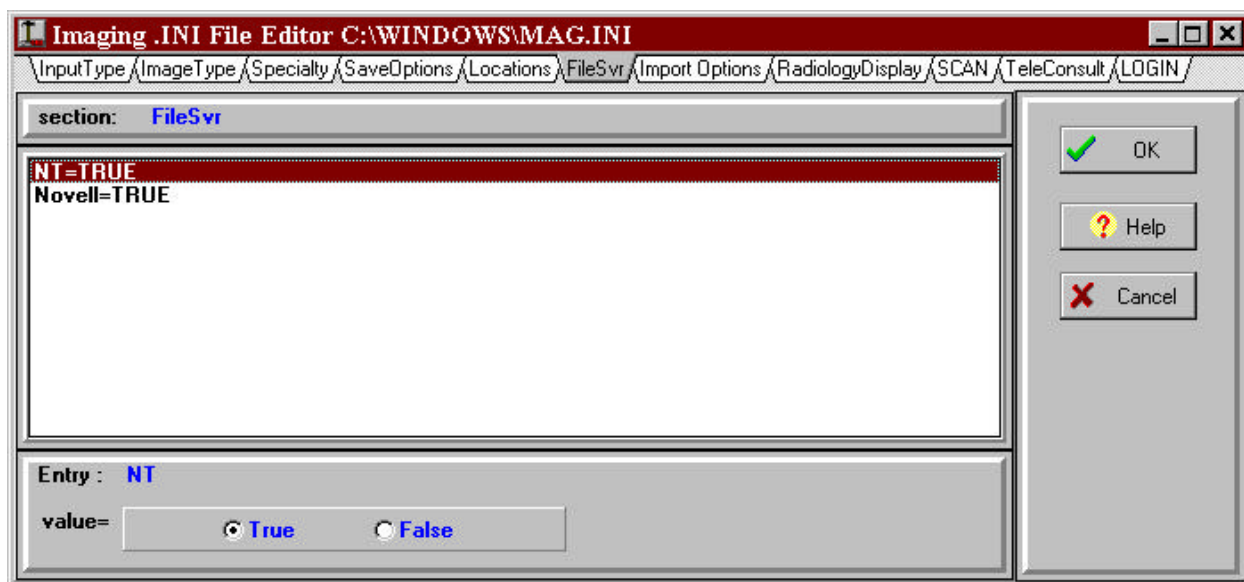
- Document TIF G3 FAX=TRUE default FALSE
- Motion Video=TRUE default FALSE
- Audio=TRUE default FALSE
- Default=X-ray default NONE

[SaveOptions] selectable at runtime YES



The user of the Imaging System Capture window has the option of saving multiple images as a “Study Group” or of saving the images as “Single” images. The default value is GROUP. You can set the switch to GROUP or SINGLE.

[FileSvr] selectable at runtime NO



The FileSvr item indicates what types of file servers are being used to store images for the **VISTA** Imaging System. This item will be the same for all workstations and will not be changed by the user. If you are using Windows NT servers as Imaging file servers, select the NT item and click on the True radio button at the bottom of the window. Otherwise, click on False. If you are using Novell servers as **VISTA** Imaging file servers, select the Novell item and click on the True radio button at the bottom of the window. Otherwise, click on False.

Note: If you are running both types of servers on the network, both NT and Novell should be set to True.

This option also enables the file server security for the imaging system. If NT is set to TRUE, then the imaging application will look up the NET PASSWORD field in the Imaging Site Parameter file (2006.1) and supply it to the server when it stores or retrieves an image.

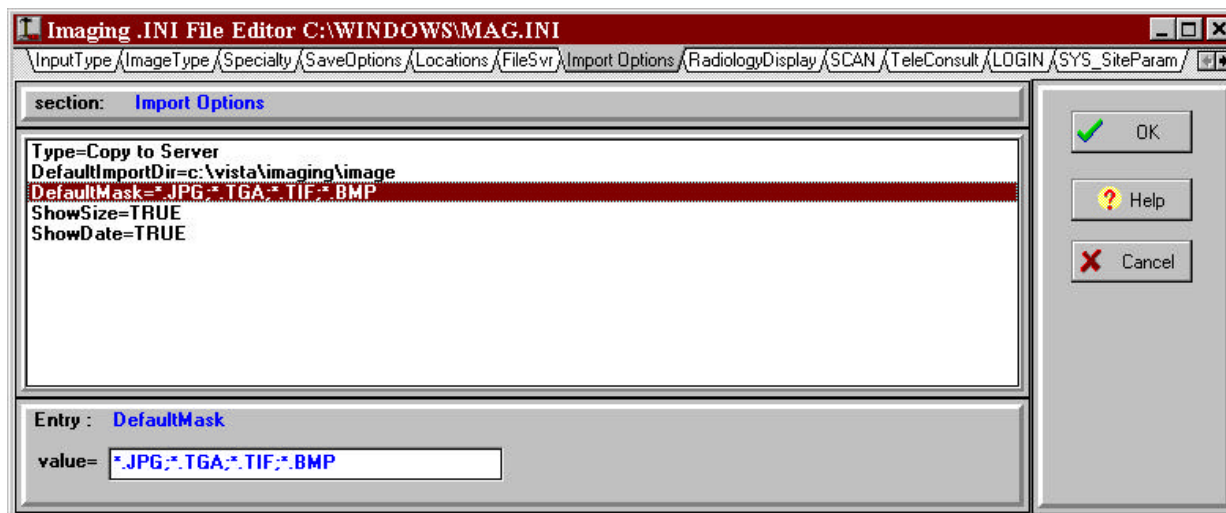
Example: If the user is logged on to the **workstation** as vhaimageuser with a password of vhaimageuser, then the application will get the **imaging file server** password for vhaimageuser from the site parameter file and supply it when storing or retrieving a file. If the user tries to browse the image shares at any time, they will get an “access denied” message because the password that they used to log on to the workstation doesn’t match the imaging file server password.

The security feature uses UNC (Universal Naming Convention) syntax to connect to the Imaging Servers. The entries in the NETWORK LOCATION file (2005.1) should all be UNC.

i.e., \\IMAGING_SERVER\IMAGE not U:\IMAGE.

- NT=FALSE default FALSE
- Novell=False default FALSE

[Import Options] selectable at runtime YES/NO



The "Import" InputType allows the user to select an existing image file from their local workstation to be imported into the Imaging System. Importing involves identification of the patient and other image-related information.

The import may be done in several different ways:

- Copy to Server
- Convert to TGA
- Convert File Format to Default

The "Copy to Server" mode means that the imported file will be copied to the server, receiving a new name assigned by **VISTA**. The file extension of the copied file will be the same as that of the original file. The file is copied exactly. This option is especially important for a compressed file format such as JPEG. Its use means that the image data is not compressed again, resulting in further loss of quality. The **VISTA** Imaging Display software will support the following formats:

- | | |
|-------|--|
| • TGA | • PSD |
| • TIF | • PCD |
| • BMP | • PCT (raster images in version 1 and version 2) |
| • JPG | • Sun Raster |
| • PCX | • WMF (raster only) |
| • GIF | • WPG (raster only) |
| • MAC | |
| • MSP | |

Note: For any other formats, please ask the imaging staff (301-427-3700).

The “Convert to TGA” mode is required at sites that are still operating Imaging version 1.0 display workstations based on Truevision Vista boards. This mode resaves the imported image to the Imaging file server using the TGA file format. This is an uncompressed format.

The “Convert File Format” to Default allows sites to convert to a selected ImageType format. The Image will be converted to the selected “ImageType”. Image Type is selectable at runtime from the menu option “Options | Configuration”. Only those types marked as TRUE in the [ImageType] section of the MAG.INI file are selectable at runtime. Currently only TGA, TIF, JPG are supported.

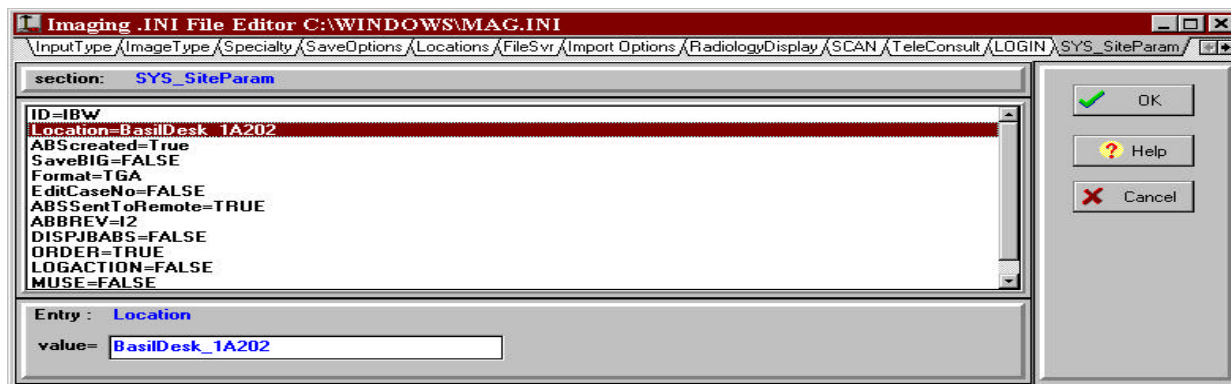
Not selectable at runtime:

- Type=Copy to Server default “Convert to TGA”

Selectable at runtime:

- DefaultImportDir=c:\image: default “C:\” (The default directory of images to import)
- DefaultMask=*.TGA: default “*.*” (The default mask; only files matching the mask will be listed.)
- ShowSize=FALSE: default FALSE (If you want the size of the image file to be displayed in the list.)
- ShowDate=TRUE: default FALSE (If you want the date of the image file to be displayed in the list.)

Note: DefaultImportDir, DefaultMask, ShowSize and ShowDate properties are saved at runtime if the user checks the “Save setting as default” checkbox on the “Select Import Directory” Window.

[SYS_SiteParam] selectable at runtime NO

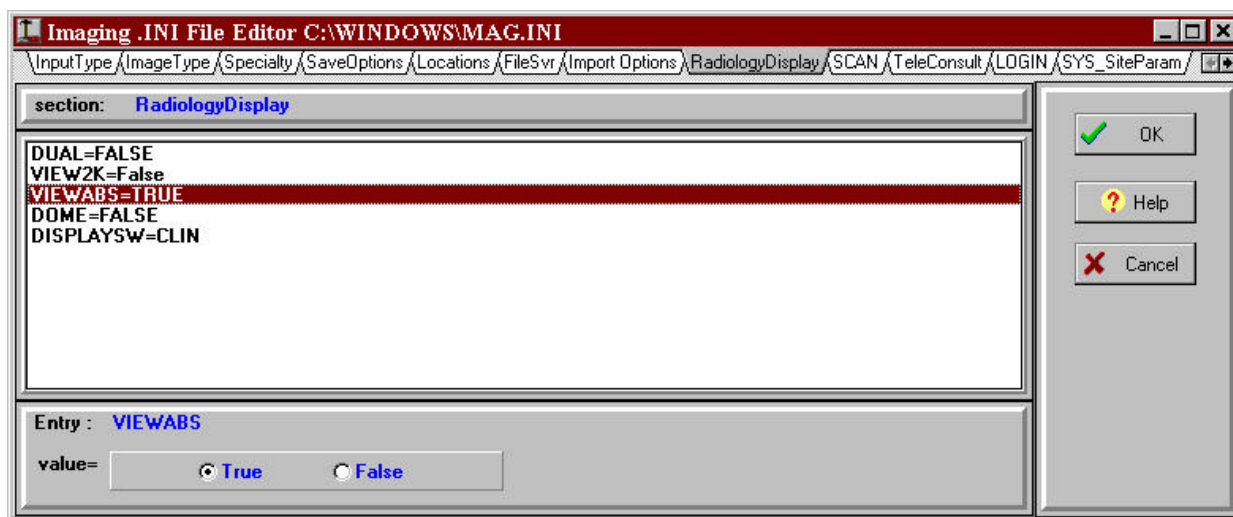
There are several site parameters that can be set by the system manager. Use a text editor to change the entries but be sure to save any edits to the MAG.INI file as ASCII text.

- ID=IRD, default=UNK: Workstation ID, i.e., "IAD" a unique identifier for this workstation, used in the Imaging Access Log File (2006.95.).
- Location=Ruth's_Desk, default=UNKLOC: Location of the workstation, a unique free text field, i.e., "GI Conference Room".
- ABScreated=True, default=TRUE: This should be set to True if the Image Abstract is to be created by the workstation. If set to FALSE, the Image Abstract will be created by the Imaging Background Processor Workstation.
- SaveBIG=True, default=FALSE: This should be set to True if the 2k x 2k scanned X-ray file is to be saved along with the 1k x 1k file and the abstract.
- ABSentToRemote=TRUE, default FALSE: Set this to True if you are using the teleconsult option and are creating an abstract locally that is sent to the remote site.
- ABBREV=I2: special entry for the Indian Health Service (IHS).
- DISPJBABS=TRUE, default TRUE: Displaying Abstracts that are located on the JukeBox takes longer than if the abstracts are on the magnetic image server. To stop the display of Jukebox Abstracts, set this entry = FALSE.
- ORDER=FALSE, default TRUE: The abstracts will be listed in reverse chronological order by the procedure date.
- LOGACTION=FALSE, default FALSE: A record of all Actions performed by the user of Imaging System display window can be saved by setting this entry = TRUE. As of 2/4/97 The Imaging team has NOT completed software to compile

the saved actions into statistics.

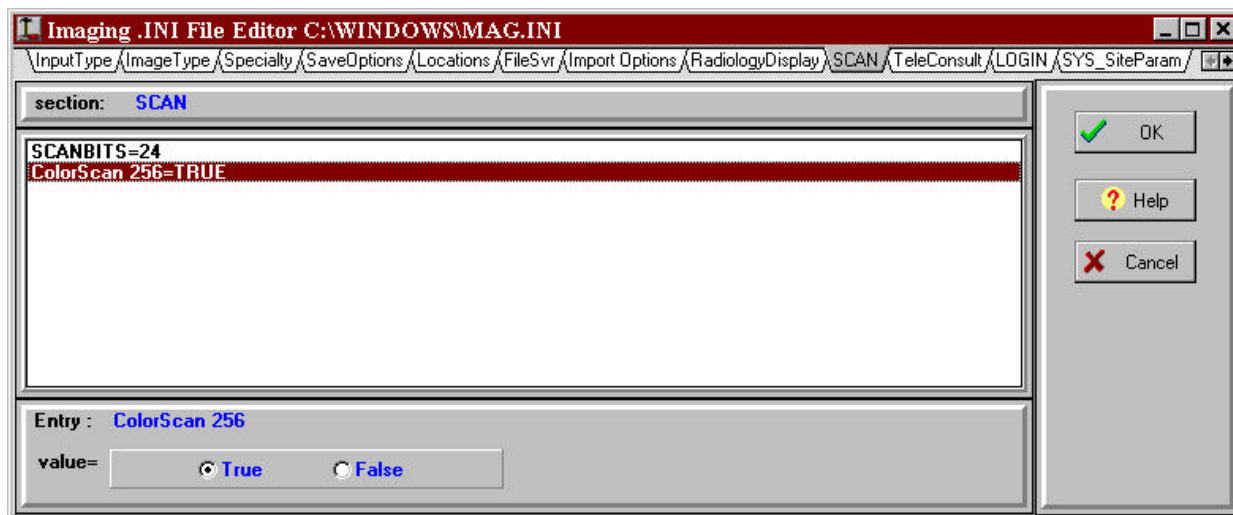
- MUSE=TRUE, default FALSE: Washington DC VAMC is testing the Imaging System interface to the Marquette MUSE EKG database. When testing is complete, the software will be available for other sites.

[RadiologyDisplay] selectable at runtime NO



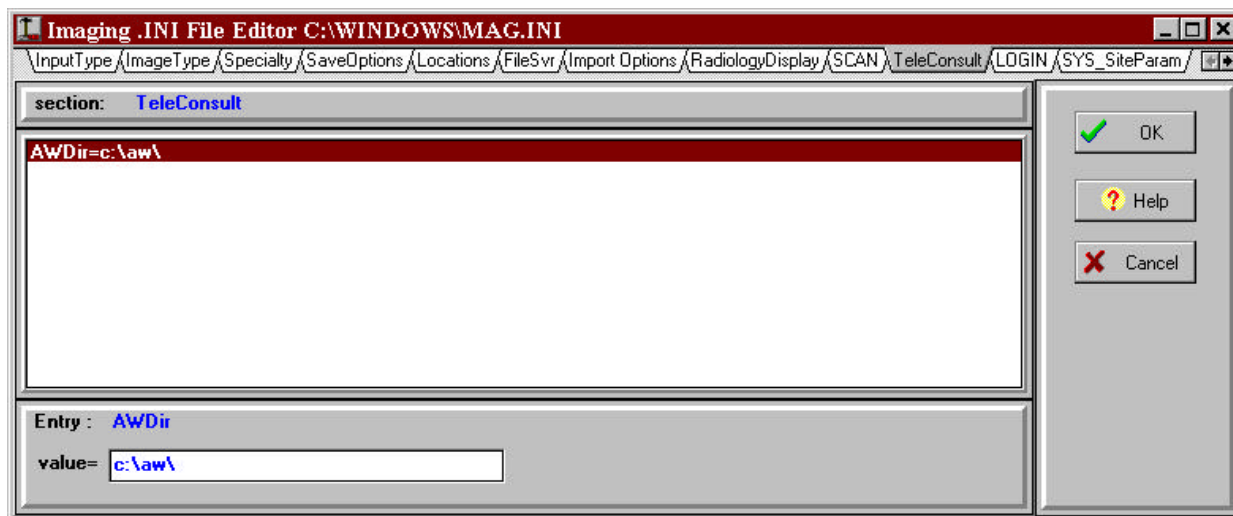
- DUAL=FALSE, default FALSE: Allows 2nd radiology window.
- VIEW2K=False, default FALSE: Shows the 2k x 2k Radiology file if it exists when set to true.
- VIEWABS=True, default True: (Abstracts are not shown when set to FALSE).
- DOME=FALSE, default FALSE.
- DISPLAYSW=CLIN, default CLIN.

[SCAN]

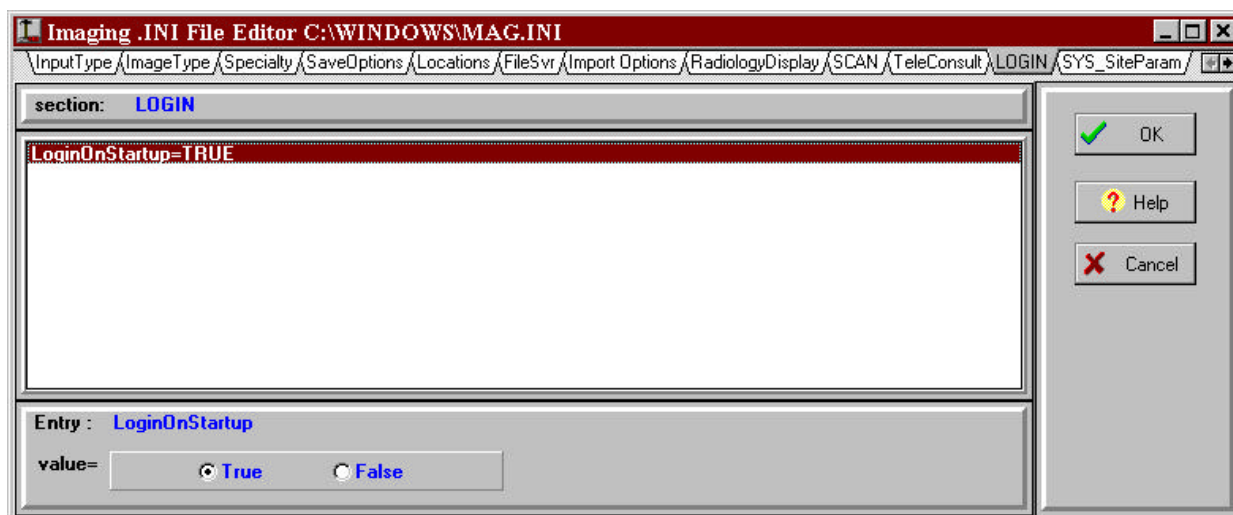


- ColorScan 256=FALSE, default FALSE: Set the ColorScan 256 entry = TRUE if the Scanner you are using is capable of scanning 256 Color Images (8-bit color.)

[TeleConsult]

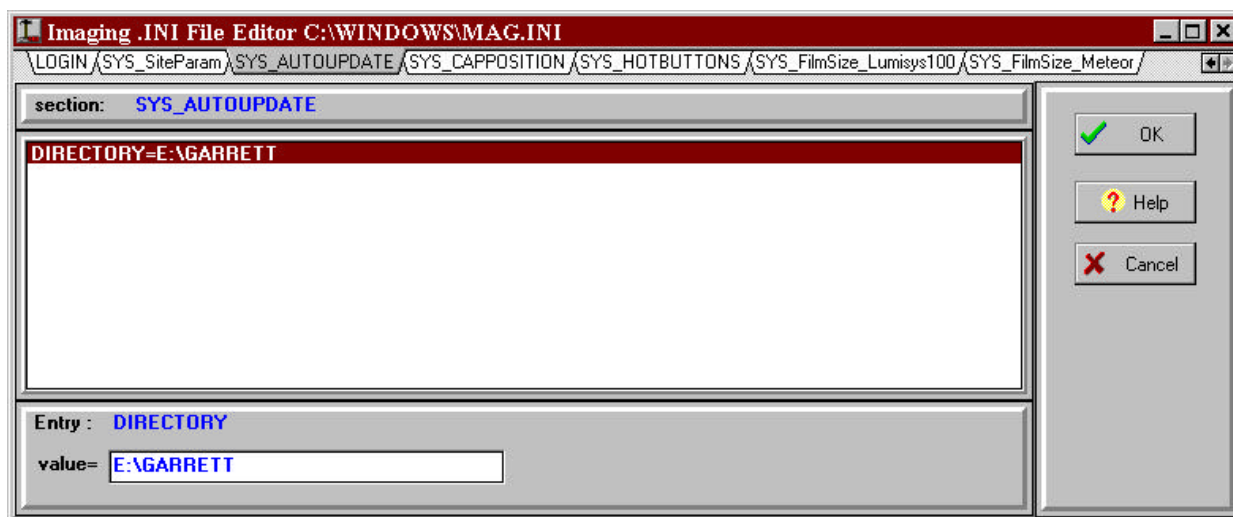


- AWDir=c:\aw\: This is the directory to which the images will be copied before they are sent (not used in Version 2.0).

[LOGIN] **selectable at runtime NO**

LoginOnStartup=TRUE, default TRUE: You can set LoginOnStartup=FALSE to disable the automatic login to the **VISTA** System. You can always login or logout by selecting the “File | Login”, “File | Logout” Options.

While testing the device to see if images are being captured to the Capture window, set this to false, and you will not have to login to **VISTA**.

[SYS_AUTOUPDATE]

These entries control the Imaging Systems autoupdate feature (See AutoUpdating the Imaging Applications for a details).

These entries are modified by the Imaging Application. Do not modify these yourself.

DIRECTORY=\\NETWORK_SERVER\UPDATES\DISTRIB

This is the directory where Imaging updates are stored. This entry is modified when MAGASET.EXE is run from the UPDATES directory; without this entry, no updating will occur.

The following two fields are not displayed in the previous screen example. Both of these fields are created and modified by the Imaging application and should not be modified by the user or system manager.

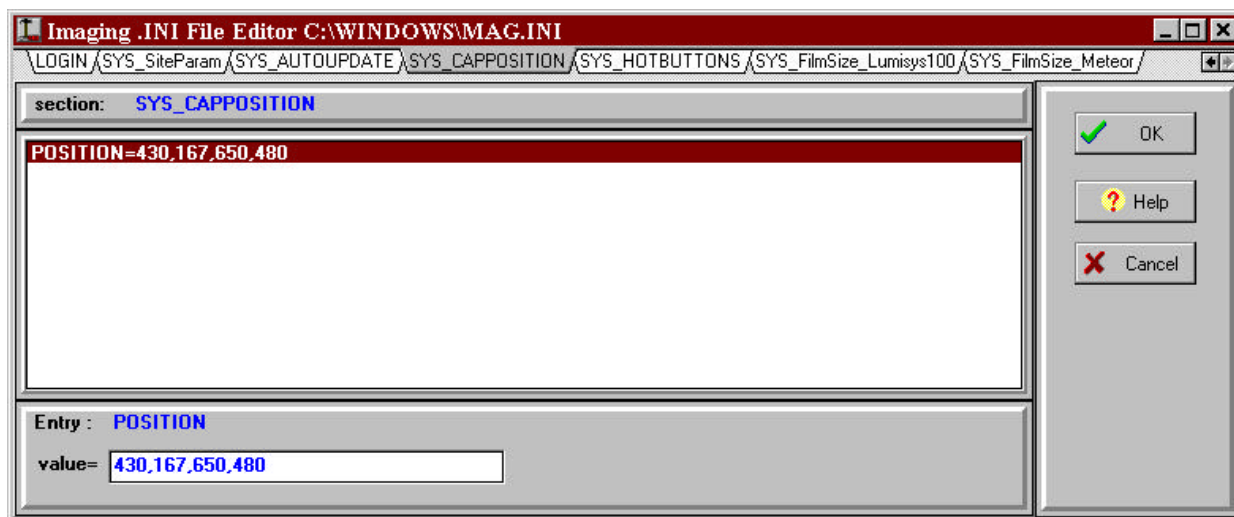
ComputerName=*GARRETT*

This is the Network Computer Name defined for this workstation through “Settings”, “Control Panel”, “Network”, “Identification”, and “Computer name”.

LASTUPDATE=2970605.1458

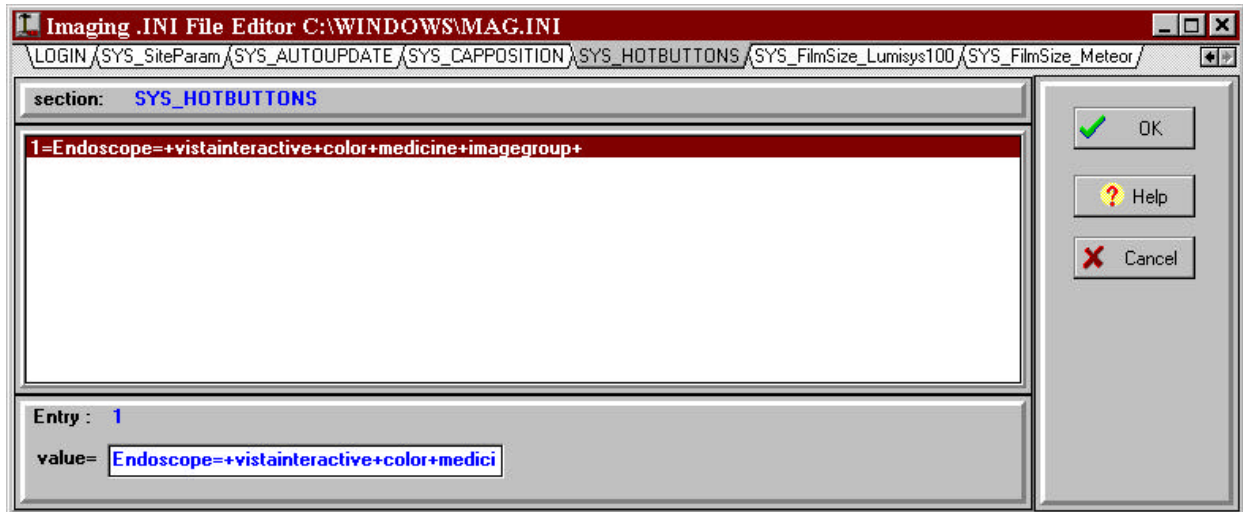
This is the date/time of the last MAGSETUP.EXE file that was run on this workstation.

[SYS_CAPPOSITION]



These entries are modified by the Imaging Application. Do not modify these yourself.

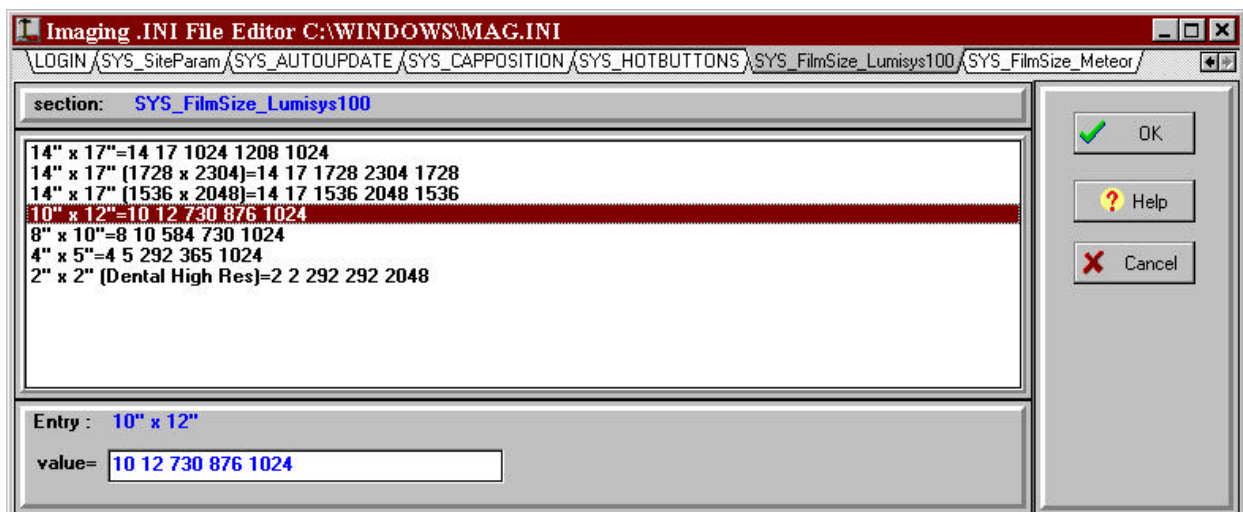
This entry is the last size and position of the Capture Window; used by the system to open the window at its last position.

[SYS_HOTBUTTONS]

These entries are modified by the Imaging Application. Do not modify these yourself.

These entries keep information for the user definable “Hot Buttons”. The “Hot Buttons” allow the user to quickly change the Input Type, Image Type, Specialty, and Single/Group to predefined settings.

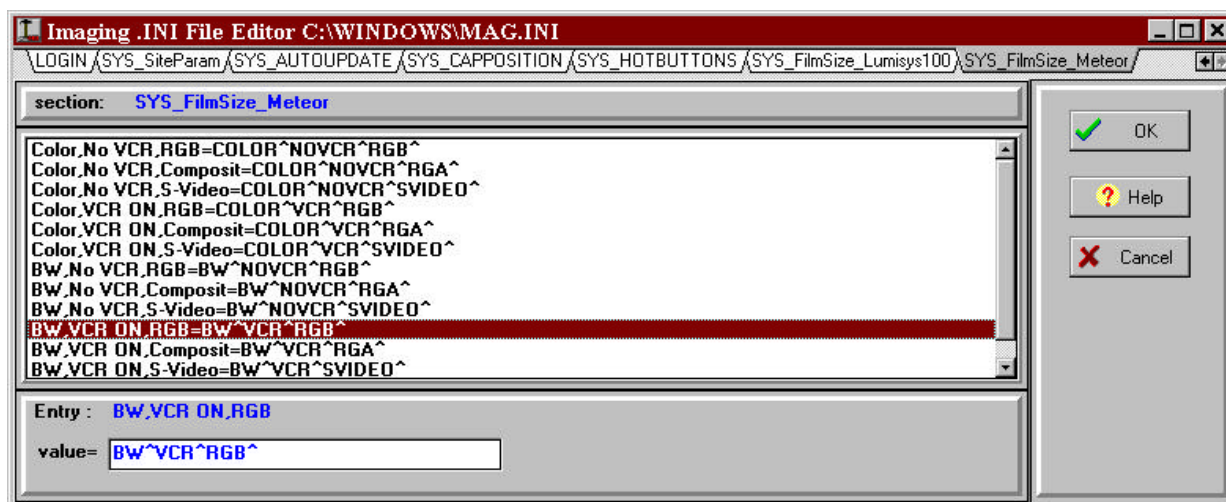
“Hot Buttons” are described in the “Imaging Workstation Configuration” Window section.

[SYS_FILM_SIZE_LUMISYS100]

These entries are modified by the Imaging Application. This section controls the configuration of the Lumisys 100 scanner. Users or system managers should not edit this section of the MAG.INI file.

These entries are used by the system as parameters for capturing images with the Lumisys 100 Input Type.

[SYS_INPUT TYPE_METEOR]



These entries are modified by the Imaging Application. This section controls the configuration of the Meteor capture board. This section of the MAG.INI file should not be changed by the user or systems manager.

These entries are used by the system as parameters for capturing images with the Meteor Input Type.

2.4.7 Security Software

Workstations must have security software in order to protect system software and applications. For Windows 95 systems, a COTS software package such as WinShield can be used to control access to the workstation files. With NT workstation, you can use system policies and profiles to control user access. The workstation BIOS should be password protected to prevent users from changing the workstation settings. Some sites have reported that their users have modified the

workstation BIOS and password protected the BIOS, making it unavailable for IRM staff to fix (See Appendix D for more information on workstation security).

2.4.8 Testing Imaging System Function

To test the Imaging System function, follow these steps:

1. Set up a test patient with...
 - At least one radiology procedure
 - Laboratory specimens
 - Surgery operation
 - Medical procedure (optional)
2. If you are using an NT workstation, you will either need to add the vhaimageuser on the workstation, or log into the site domain as vhaimageuser (**Note:** To ensure security, you should log into the workstation or the site's domain with a different password than the imaging file server vhaimageuser).
3. If you are using Windows 95, log into the workstation as vhaimageuser with a different password than the file server vhaimageuser.
4. Follow the instructions below to test each specialty package. The Imaging User Manual or online help contains more detailed instructions on use of the software.

2.4.8.1 Testing Medicine Package Interface

To test the Medicine Package Interface, follow these steps:

1. Launch the capture application.
2. Use the Medicine specialty Option on the Options | Configuration | Specialty/mode/group Window to capture an image for your test patient. Your test patient must be entered as a "medical patient" first.
3. Click on the "Select Medicine Procedure" button and select a procedure for your test.
4. You can perform this test with or without a video-input device; if you do not have a video device, use the "Import" option.
5. Enter a description that contains the word TEST so you can identify the image.
6. Save the image by clicking on the "Capture" button, and then on the "Image OK" button.
7. Click on the "study complete" button.

8. Use the Display Window and select the test patient. You should see the abstract for the image you just captured. You should be able to select this abstract and you will see the group window with one abstract.
9. Click on this abstract and the captured image should be displayed in full resolution. Clicking on the report button should display the report header information.
10. Verify that it is the image you just captured.

2.4.8.2 Testing Radiology Package Interface

To test the Radiology Package Interface, follow these steps:

1. If your site is using the Radiology package for image capture, open the Imaging V. 2.0 Capture program to capture an image for the test patient.
2. Select Options | Configuration, and select X-ray as the Image Type and Radiology as the Specialty.
3. You will need to set up a case number for the test patient; use the Radiology ordering process to do this. You may need assistance from someone who knows the radiology ordering and reporting process in detail.
4. Click on the “Select Radiology Exam” button and select a radiology exam for your test.
5. If you are using a scanner to capture an image, it must be properly set up for testing. You should also test using the other input types (In this case, you do not need to have the device connected to test the software).
6. View the image and report as described above.

2.4.8.3 Testing Anatomic Pathology Interface

To test the Anatomic Pathology Package Interface, follow these steps:

1. Open the Imaging V. 2.0 Capture program to capture an image for the test patient.
2. Select Options | Configuration.
3. Select Laboratory as the Specialty under Options | Configuration (**Note:** Prior to capturing, the test patient must have a Laboratory accession number. You will need to use the Laboratory package AP menu option on the **VISTA** M System to accession the test patient. If you are unfamiliar with these options, ask for

assistance from someone who knows the anatomic pathology processing and reporting steps).

4. Click on the “Select Laboratory Specimen” button and select a specimen for your test.
5. To capture images under the Laboratory specialty, you will also need to specify the...
 - Laboratory sub-specialty (i.e., Surgery Path, EM, etc.)
 - Accession year
 - Accession number
6. Once this is provided, a window with a list of specimens will display and you must select the specimen that pertains to the image.
7. Capture an image from the camera-input source or, as described above, from no input source.
8. View the image as described above using the **VISTA** Imaging System display options.
9. Verify that the captured image displays correctly both as an abstract and as a full image.
10. View the reports also.

2.4.8.4 Testing Surgery Package Interface

To test the Surgery Package Interface, follow these steps:

1. Open the Imaging V.2.0 Capture program to capture an image for the test patient.
Note: The test patient must have an operation in the system prior to capturing.
2. Select Options | Configuration.
3. Select Surgery as the Specialty under Options | Configuration.
4. Click on the “Select Surgery Case” button. A surgery case list will be displayed. Select the case for your test.
5. Capture an image from the camera-input source or, as described above, from no input source.
6. View the image as described above using the **VISTA** Imaging System display options.

7. Verify that the captured image displays correctly both as an abstract and as a full image. You should be able to see the surgery report when you click on the report button.

2.5 Background Processor

2.5.1 Background Processor Introduction

The background processor software runs on a workstation connected to the network. It currently runs M software and uses DDP to read globals on the **VISTA** host system. Background processor functions are expected to be converted to the Delphi user interface in the near future.

When images are captured, the capture application sets an entry in the IMAGE BACKGROUND QUEUE (2006.03) file on **VISTA** requesting that the captured file be copied to the Jukebox. The background processor continuously polls this queue and processes any pending requests. When images are displayed (if the image file being requested is on the Jukebox), the application will set a queue entry to request that the file be copied from the Jukebox to the magnetic drive. When images are captured, the file is first written to the file server, and then an entry is set in the IMAGE BACKGROUND QUEUE file (2006.03) to have the image, abstract, and text files copied to the jukebox.

2.5.2 Functions of Background Processor

The background processor performs the following functions:

- Creates abstracts out of full size images. This function can also be performed by the workstation depending on the mag.ini file settings.
- Copies full size images and abstracts from the magnetic drive to the Jukebox.
- Copies full size images and abstracts from the Jukebox to the magnetic drive.
- Transfers files to remote sites for Teleconsult option.
- Deletes image files from the file server

2.5.3 Background Processor Components

The background processor is composed of the following:

- Dedicated workstation with Windows NT installed and configured on the network

- MSM/NT

2.5.4 Background Processor Distribution

The background processor software is initially distributed as a fully loaded MSM database contained in an InstallShield setup package. The site will need to install a license key and change an entry in the translation table. In the future, the Background Processor will be converted to a Delphi program.

2.5.5 Background Processor Installation Instructions

Follow these instructions for installing the background processor:

1. Run the background processor installation file, MagBPNT.exe, on the Windows NT Workstation system that will become the background processor.
2. After running MagBPNT.exe, which installs an MSM Database file, use the MSM for NT diskettes that you purchased and run the setup.exe program to **UPGRADE** the database.
3. The database is sent with a default Link defined as DC21X41 (most DEC and SMC Ethernet cards). If you have another brand of Ethernet card, use the information in the following sample as a guide to change the Link type.

Changing the link definition

```
[MGR,BPA]>D ^SYSGEN

      MSM - System Generation Utility

Select SYSGEN Option: <RET>

Select Option: 3 - Edit Configuration Parameters

Select Configuration <IMAGING>: <RET>

Select Option: 15 - DDP and LAT Configuration

Select Option: 2 - Link Definition

Current Links Defined:

Link    Device Name
----    -
  1      10

Select Link Number: 1

Link Type:

  1 - MSM Data Link
  2 - TCP/IP
  3 - UDP/IP
  4 - IPX
  5 - SPX
```

```
Select Link Type <10>: 1

Adapter Card Name <DC21X41>: <RET>

Current Links Defined:

Link      Device Name
-----
  1      DC21X41

Select Link Number: <RET>
```

4. Click on the menu icon to start the background processor. You will see the following screen because the database was shipped without a license key.

```
MSM-PC/PLUS, Version 4.0.11F
Copyright (C) 1984-1993, Micronetics Design Corporation

*** Error encountered in processing the 'license.msm' file ***
Explanation: Invalid format of 'license.msm' file (7)

The following 'license.msm' defaults will be used:
  MSM Serial Number.....: 9999999
  Maximum Concurrent Users.....: 1
  Maximum Network Users.....: 0
  Expiration Date.....: 04/09/97 (Today!!)
  DDP Option.....: Off
  LAT Option.....: Off

Type D ^MSMKEY to correct errors in the license.msm file
or to update it with new value(s).

Remaining in baseline system

>
```

5. Type **D ^MSMKEY** and enter the license key information that was distributed with your own copy of MSM.
6. Type **D ^SSD** to shut down the system.
7. Restart the system by clicking on the Background Processor icon (Start | Programs | Background Processor | Background Processor) again and choose option 5 to quit the background processor menu.
8. Type **H** to exit from the VAH UCI and hit <enter> for the UCI prompt. Type **MGR:xxx** (xxx is the default programmer access code) and you will be in programmer mode in the MGR UCI.

9. Follow the dialogs below to edit the translation table and change the DDP group (if necessary - this database is shipped with the DDP group set to 0).

```
[MGR,BPA]>D ^TRANSLATE

      MSM - Translation/Replication Management Utility

Available Functions:

    1 - Edit Translation Table
    2 - Enable Translation
    3 - Disable Translation
    4 - Edit Replication Table
    5 - Translation Table List
    6 - Replication Table List

Select Option: 1 - Edit Translation Table

Current Translation Table:

    Global      Translate      Lock   Repl   Functions      Coll Global
#  Name(s)      From UCI  To UCI   Master  Ind   Enabled      Seq  encode
-----
1  MAG*          VAH,BPA  VAH,XXX  VAH,XXX  ---  TRANSLATION  NUM  8-bit
                                LOCK MASTER

Translation is enabled
Enter Translation Table Index: 1

Global name <MAG*>: MAG*

Collating sequence <NUMERIC>: NUMERIC

Global encoding [7=7-bit/8=8-bit] <8>: 8

UCI to translate from <VAH,BPA>: VAH,BPA

UCI to translate to <VAH,XXX>: VAH,VAA    <===== CHANGE THIS TO THE Vista VOLUME WHERE
                                         YOUR MAG* GLOBALS ARE LOCATED ****

UCI for maintenance of locks <VAH,VAA>: VAH,VAA

Replication table index: <RET>

Enable translation <YES>: YES

Enable lock table translation <YES>: YES

Enter Translation Table Index: <RET>

DDP Group Change:

[MGR,IAC]>D ^SYSGEN

      MSM - System Generation Utility

Select SYSGEN Option: <RET>

Select Option: 3 - Edit Configuration Parameters

Select Configuration <IMAGING>: <RET>

Select SYSGEN Option: <RET>

Select Option: 15 - Network Configuration
```

Available Functions: <RET>

- 1 - DDP System Parameters
- 2 - Link Definition
- 3 - Circuit Definition
- 4 - DDP Groups
- 5 - Network Security
- 6 - LAT System Parameters
- 7 - LAT Node Management
- 9 - OMI Translation Table
- 10 - Display Network Configuration
- 11 - Workstation Server Configuration
- 12 - User-Defined Services
- 13 - Telnet Service Configuration

Select Option: **4** - DDP Groups

Enter DDP Group Number: (See "Note" for details)

Note: The default DDP Group is 0; your site may use 15 for the **VISTA system. Check with your system manager.**

1. If you made any system changes, you must restart MSM. Shut down MSM by typing D ^SSD.
2. When you restart the background processor, exit the menu and hit a <CR> to get the UCI prompt.
3. Enter VAH:XXX to get to programmer mode in VAH. Test the DDP connection and translation by getting a global listing of the MAG global.

D ^%G

Global ^MAG

.

(You should see global nodes here)

1. Log in to your **VISTA** system and enter the background processor into the Imaging Workstation file (2006.8). Most of the fields are not necessary for the background processor. You must fill in the BACKGROUND PROCESSOR, JUKEBOX, JBTOHD, and DELETE fields. A sample dialog is shown below. The MAG SYS-ENTER/EDIT WORKSTATION option requires the MAG SYSTEM key assignment.

Select OPTION NAME: **MAG SYS-ENTER/EDIT WORKSTATION** Enter/Edit Workstat
ion File
Enter/Edit Workstation File

```

Select IMAGING WORKSTATIONS NAME: BPA
NAME: BPA// <RET>
BACKGROUND PROCESSOR: YES// <RET>
ABSTRACT: NO// YES
JUKEBOX: NO// YES
JBTOHD: NO// YES
*FILECOPY: NO
EXPORT64: NO
IMPORT64: NO
DELETE: NO// YES

```

2. To start the Background processor from programmer mode (it also comes up automatically when you click on the icon), type **D ^MAGBMENU** in the VAH UCI. Enter 1 to start the background processor. Other Background processor management functions are also available.
3. Change the Volume Group Name (optional).

The MSM database is sent with a default volume name of BPA. If you want to change the volume group name do the following. (You will also have to change the entry in the Imaging Workstation file (2006.8).

```

[MGR,BPA]>D ^SYSGEN

      MSM - System Generation Utility

Select SYSGEN Option: <RET>

    1 - Display Configuration Parameters
    2 - Create New Configuration
    3 - Edit Configuration Parameters
    4 - Edit Configuration Name/Comment
    5 - Delete Configuration
    6 - Set Default Startup Configuration
    7 - UCI Management
    8 - PC Environment Configuration
    9 - System Configuration Parameters
   10 - Database Definition
   12 - Device Translation Tables
   13 - Mnemonic Namespaces
   14 - Journaling Management

Select Option: 10 - Database Definition

Select Database Maintenance Option: <RET>

    1 - Create a Database Volume
    2 - Reinitialize a Mounted Volume
    3 - Display Mounted Volume Groups
    4 - Mount a Volume Group
    5 - Unmount a Volume Group
    6 - Expand a Database Volume

```

- | |
|---------------------------------------|
| 7 - Rename a Volume Group |
| 8 - Mount a Remote Volume Group |
| 9 - Edit Volume Group Characteristics |
| 10 - Before-Image Journal Functions |
| 11 - OnLine Backup Functions |

2.6 Jukebox Software Installation

The directory structure for the jukebox will be undergoing some changes in the near future. Please contact the Imaging Development team for the latest information before installation.

2.6.1 Background

The Optical Technology Group (OTG) software is used to control file migration to and from the jukebox. When installed, the jukebox appears on the network as another NT file server with an image share that can be accessed from any client workstation. The share spans all platters in the jukebox, which gives the appearance of one large magnetic drive. NT directory style security is used to limit access to the share. A client workstation will only have read access to the share; the background processor will have read and write access to the share.

It is recommended that you have your jukebox hardware set up by the vendor. Follow the instructions supplied with the jukebox. There are two (2) software components required to run the jukebox:

- Microsoft SQL Server
- OTG DISK Extender

The OTG Disk Extender jukebox software is loaded on the NT file server to which the jukebox is connected. OTG uses Microsoft SQL Server database software to track location of files on platters and other statistical information.

Note: Be sure to use the correct version.

2.6.2 Installing Microsoft SQL Server

1. Run the setup program from the installation CD.
2. Under MS SQL options, choose "Install SQL Server and Utilities".
3. For SQL Server Installation Path, be sure to choose a drive that is backed up frequently and has enough space for a one (1)-GB database.
4. Leave the default settings for master device creation.

5. Install books online to run from hard drive (optional).
6. Under installation options, select “Auto Start SQL server at boot time”.
7. Leave the default settings for “character set”, “sort order” and “additional network support”.
8. Set the SQL services to log on as Administrator.
9. After the installation completes, reboot the system.
10. If the MS SQL Server service or the SQL Executive service fails to start after the system boots (you will see an error in the event log), do the following:
 - a. Open the control panel.
 - b. Double-click on the services icon.
 - c. Double-click on the service that failed to start (MS SQL Server or the SQL Executive).
 - d. Check the “This Account” radio button and use the “...” button to browse for the Administrator account.
 - e. Double-click on Administrator; click on OK; type in the password for administrator and confirm.
 - f. Click on OK.
 - g. Click on Start to start the service.

2.6.3 Installing the OTG Software

Follow these steps to install the OTG Software:

1. Run the setup program on the first installation disk. The two components of the software installation process are **software installation** and **configuration**.
 - a. **Software Installation**
 - For the first part of the setup, choose all of the defaults.
 - b. **Configuration**
 - Database

- ❑ Create a database of 1024 mb (1 GB) of type “SQL Server 6.x”. Be sure that the disk in “Location For Files” is a disk that gets backed up regularly and is large enough to support a 1-GB or greater database.
 - ❑ For the administrator ID, keep the default (“SA”) and leave the password blank, unless you changed the default SQL administrator password.
 - Hardware
 - ❑ In the hardware dialog box, under jukebox, you will see an entry SCSIyyyy, where yyyy is some number. The entry will have multiple drives under it - this is your jukebox device.
 - ❑ Double-click on this device and name it "VHAxxxIMJB1", where xxx is your three-character assigned site name. If you have multiple jukeboxes, increment the last digit.
 - Cache
 - ❑ Change the cache size to 1000 mb (1 gb). Keep all other default settings. Click on "OK" to complete Cache configuration.
 - Network
 - ❑ Under the SMB tab, change the “Server Name” to “VHAxxxIMGJB1”, where “xxx” is your three-character assigned site name.
 - ❑ Change the “Announce Domain” to the name of your Image domain (i.e., VHAxxxIMG).
 - ❑ Check the radio button that says “Use NT integrated user/group security.” Click on the “Domain Names” button and add the name of your Image domain. If your site has a site domain configured, add that name as well. Leave all other default settings as is. Click on “OK” to complete Network configuration.
 - System
 - ❑ Leave all default settings as is for system configuration.
- c. **Exit the Configuration and Reboot the System.**
2. If the Disk Extender service fails to start (you will see an error in the event log), do the following:

- a. Open the control panel.
 - b. Double-click on the services icon.
 - c. Double-click on the Disk Extender.
 - d. Check the “This Account” radio button and use the “...” button to browse for the Administrator account.
 - e. Double-click on Administrator; click on OK.
 - f. Type in the password for Administrator and confirm it; click on OK.
 - g. Click on START to start the service.
3. Creating Jukebox Partition -- Write Path and Share.
- a. Create the partition.
 - Click on the Administrator icon in the Disk Extender group.
 - Click on the connect button in the upper left-hand corner; this connects you to the SQL database.
 - Right-click on the Partitions; left-click on New Partition.
 - Under “New Partition Name”; enter “IMAGEPAR1”; click on Next.
 - Leave the “\” write path unchecked ; click on “Next”.
 - Leave the box for “\” path unchecked again. Change the share name to “IMAGE1” and make the volume name “DEX”; click on “Next”.
 - Click on “Finish”.
 - b. Create a write path.
 - Expand the IMAGEPAR1 tree structure by clicking on the plus (+) sign.
 - Under IMAGEPAR1, right-click on “Write Path” and left-click on “New Write Path”.
 - For “New Directory Name”, type IMAGE and click on “Create”. You will now see the IMAGE directory appear in the tree under root.
 - **Single-click on the IMAGE folder to select it as a write path (The root directory is selected by default!) and click on OK.**

- After the write path has been successfully created, click on No to edit Write Path properties, as this will be done when adding media to the partition.
- You will now see the \IMAGE\ write path under the Write Path section of the tree structure.

c. Create a share.

- Right-click on Shares and left-click on New Share.
- Click on the IMAGE folder to select the IMAGE directory as the write path. **(Note: “\” is the default, not IMAGE!)**
- Type in “IMAGE1” as the share name and “DEX” as the Volume Name
- Click on OK.
- To limit access to the newly created IMAGE1 share do the following:
 - ❑ Right-click on the IMAGE1 folder under “shares” (use the plus (+) to expand the tree if it is not expanded already).
 - ❑ Left-click on security.
 - ❑ In the Share Name Permissions dialog box, remove “Everyone” and add the “xxx Image Users”. Give this group read permissions. Now add the xxx Image Admin group and give them full permissions **(Note: xxx is your three character assigned site name)**.

4. Adding media to the partition

a. Insert the media into the jukebox.

- Launch the Disk Extender Console application from the Disk Extender menu.
- Hit F2 to see the jukebox profile.
- Find the first available shelf and click on it to select the shelf.
- Click on the Insert button and follow the instructions on the screen.

b. Assign the media to a media path.

- Launch the Disk Extender Administrator application from the Disk Extender menu.
 - Expand the partition tree by clicking on the plus (+) sign.
 - Expand the foreign media tree by clicking on the plus (+) sign.
 - Right-click the newly added media, and use the schedule/prepare option to format the media.
 - Once you have formatted the media, it will appear in the media tree.
- c. Add the media to the write path; expand the write path tree by clicking on the plus (+) sign.
- Right-click on the \image\ write path and left click on properties.
 - Click on the media tab, and use the add button to add media to the right path.
 - Select the media to add and click on the OK button (**Note:** you can select multiple platters to add).
 - Use the promote and demote buttons to configure the order to which platters are written.

5. Jukebox Administration

- a. Launch the Disk Extender Administrator application from the Disk Extender menu.
- b. Expand the System tree by clicking on the plus (+) sign.
- c. Double-click on Event Schedules.
 - Database maintenance
 - ❑ Double-click on the item and schedule a daily time for database maintenance to occur (i.e., 12:00 am).
 - ❑ Click on the Advanced button.
 - Check “Perform Database Consistency Check”.
 - Check “Full”, “Update Statistics”, and “Rebuild Indexes”.

- Select “Backup to Disk” from the Type Pull Down list and specify a path to a directory that is regularly backed up to tape (i.e., d:\dex\Dbbackup).

Note: It is very important that this file gets backed up to tape regularly as it holds all of the information about location of files on the platters.

- Click OK to apply these options.

- File Move to Media

- ❑ Double-click on the item and set the start and stop times to 12:00 am (This will cause files to be immediately moved from the jukebox cache to the platters).

2.6.4 Updating **VISTA** Files for Jukebox

On the **VISTA** system:

1. Add a network location for the jukebox in the Network Location File (2005.2) with the following attributes:

```
NETWORK LOCATION: WORMOTG
STORAGE TYPE: WORM-OTG
OPERATIONAL STATUS: ONLINE
PHYSICAL REFERENCE: \\VHAxxxJB1\IMAGE1\
```

This network location points to the jukebox share that was created when the OTG jukebox software was installed. All images will be copied to this location for permanent storage.

2. Add an entry for the jukebox in the Jukebox File (2006.032) with the following attributes:

```
JUKEBOX NAME: Optical Technology Group
JUKEBOX DEVICE: \\VHAxxxJB1\IMAGE1\
CURRENT WRITE PLATTER: WORMOTG
NUMBER OF CARTRIDGES: 1
PERCENT FREE SPACE: 2.5
LAST TIMESTAMP FOR SIZE: <RET>
JB VOLUME SIZE ROUTINE: MAGBJBS0
USE SUBDIRECTORIES: Use Subdirectories
JUKEBOX VOLUME NAME: OTG Disk Extender
```

MEDIA NAME: <**RET**>

The Background processor will use this entry to determine the destination to which images will be copied. It copies images from the Imaging file servers where the image was captured to the jukebox platters.

Note: xxx should be replaced with your 3-character assigned site code.

Chapter 3 Installing Image Acquisition Devices

3.1 Imaging System Video Inputs

3.1.1 Introduction

There are many types of medical equipment that produce video output appropriate for image capture. These include...

- endoscopy cameras
- ultrasound equipment
- microscope cameras
- cardiac catheterization systems
- nuclear medicine devices
- dental cameras

Much of this equipment is described below.

The **VISTA** Imaging Capture Window allows images to be captured using the following devices:

- Image Capture Boards (Matrox Meteor, Truevision ATVISTA)
- X-Ray Scanners (Lumisys, Howtek, Vidar)
- Color and Gray scale scanners with TWAIN interface
- Still Video Cameras (these must have a TWAIN interface or be capable of downloading standard format images such as JPEG to a workstation)
- Import of standard format images from workstation's local hard drive (e.g., JPEG, TIF, TGA, BMP, etc.)

3.1.2 Workstation Video Capture Board Installation and Setup

The process of acquiring digital images by analog-to-digital conversion of the analog video signal is called "frame grabbing". This process normally takes place in 1/30 second. A frame-grabbed standard NTSC (RS-170) video image consists of approximately 480 lines with 640-768 pixels per line. A pixel typically contains 16 or 24 bits for color (5 or 8 bits for red, 5 or 8 bits for green, and 5 or 8 bits for blue, for 32,768 or 16 million total colors) or 8 bits for black & white (256 shades of gray). Other pixel depths are possible.

The **VISTA** Imaging System supports several image capture boards as follows:

- The Matrox Meteor image capture board operates in the Windows environment. The live video image is displayed on the S-VGA monitor and still images can be captured and saved. The Meteor/RGB board will accept RGBSync or composite input. The Meteor board will accept S-Video or composite input. Either board will handle color or black and white input. Captured images are 640x480x24 bits.
- In the past, **VISTA** Imaging sites have purchased Truevision ATVISTA image capture boards which are supported by the Version 2.0 software under Windows 95 (not Windows NT).
- In the near future, the **VISTA** Imaging System will support video capture boards that can capture still images using Microsoft's VidCap software. We are currently testing the Miro DC30 board, which supports composite video and S-Video inputs. Captured images are 640x480x24 bits and are compressed at a ratio of at least 3:1.

Setup Steps:

1. Install Image Capture Board in Workstation. Follow vendors instructions.
2. Locate the connector on the medical device which outputs a video signal.
3. Determine what type of signal is output (i.e., RGBSync, S-Video, or Composite).
4. Be sure that your image capture board can handle the type of output signal that is available.
5. Obtain a cable that will connect to the output connector of the video source and to the input connector on the image capture board. For Red-Blue-Green-Sync sources, you will need to compare the mapping of the signals to the pin numbers of the source connector and the capture board input connector. If they do not match, you will need to have a correct cable made; be sure to label the ends of the cable for the input source and image-capture board.

Review the following information:

- Meteor/RGB Board will handle Red-Green-Blue-Sync and composite. The Meteor Configuration parameters must be set for the input connector type, whether the image is color or black and white, and whether the input is from a VCR.
- Meteor board will handle S-Video and Composite. The Meteor Configuration parameters must be set for the input connector type, whether the image is color or black and white, and whether the input is from a VCR.
- The ATVISTA Board will handle Red-Green-Blue-Sync input. If you have composite or S-Video input, you will need a converter box such as a

Truevision VID/IO box (no longer sold) to convert the signal. Black and white signals going to the ATVISTA board may require a VID/IO box also (See Imaging V. 1.0 documentation or section 3.1.2.3 of this installation guide for connections to VID/IO box and Sony Frame Store).

- Some signals lack proper horizontal or vertical synchronization for the image capture board. This has been observed especially with the ATVISTA board. These signals must be regenerated and converted to RGB format before being presented to the capture board. A Sony Frame Store device can be used for this purpose. The input signal is supplied to the Frame Store, and the RGBSync signal is obtained at the output. A four-lead BNC-to-DB9 cable should be used to connect the Frame Store output to the image capture board (The Alpha lead must be connected to a composite video output or S-Video Y (luminance) output to obtain black & white images).
6. Connect the cable to the video source and the image capture board.
 7. Use the configuration window under Options on the **VISTA** Imaging Capture Window to define your input source, save formats, and **VISTA** specialty report association (See user online help). If more than one configured device is used on a workstation, you should create a button for each.
 8. Use the test mode (without connecting to the hospital system) to be sure you are getting input from the device.

3.1.2.1 Endoscopy Equipment

Endoscopy equipment (Fuji or Olympus) produces RGB video signals. The Red/Green/Blue/Sync signals can be obtained from the back of the endoscopy video monitor and passed directly to the Meteor or ATVISTA image board. A four-lead BNC-to-DB9 cable should be used.

Note: Because of the invasive nature of the endoscopy procedure, the VISTA Imaging Workstation connected to the endoscopy equipment must have an isolation transformer with less than 100 micro amps leakage.

3.1.2.2 Color Video Cameras

Video cameras use CCD chips to produce an image from the input light. The CCD chip may vary in spatial resolution. Less expensive cameras use one (1) CCD chip to produce the image. More expensive cameras use three (3) CCD chips to improve the quality of color images.

The camera lens also affects image quality. Be sure that the video camera is equipped with a standard mount for the lens. The most common video camera lens mount is the C-mount; there are a variety of lenses available at reasonable cost for this mount. Other cameras may use the Fujinon or Nikon mount. In general, cameras are sold without the lens, allowing the purchaser to match the lens to the purpose of the camera. A lens that allows auto focus and auto iris is convenient. Good macro capability is necessary for close up work. The camera body (without the lens) may be placed on a microscope or other optical instrument equipped with a C-Mount adapter. Be sure these are parfocal so the user does not have to refocus when switching between microscope ocular and computer monitor display; this may require purchase of an additional adapter. Cameras should also be capable of being mounted on tripods.

Many color video cameras produce both RGBSync and Composite NTSC signals. The RGBSync is supplied by a DB9 female connector. A male-to-male shielded DB9-to-DB9 cable can be used to pass the signals to the Meteor or ATVISTA image capture board. An unshielded cable DB9-to-DB9 cable can be used, but be cautious about high-frequency noise. Check the pin assignments on your camera and compare them to the Meteor board when purchasing a cable. For the ATVISTA board, pins 1-7 should be connected straight through, while pins 8 and 9 should be cut.

Some cameras produce Composite NTSC video signals. This signal is accepted by Meteor/RGB and Meteor image capture board. The Meteor board accepts an S-Video signal, directly.

3.1.2.3 Black and White Image Capture

Meteor: On the **VISTA** Imaging capture configuration window, select an option that begins with BW for Black and White capture. Select an Image Type of either Black and White or X-Ray. Use test mode to be sure your input is correct.

ATVISTA: In order to capture a black and white image, a black and white video signal must be provided to the alpha channel. This signal **must not contain color information**. If it does, the captured image will contain a very-fine cross-hatch pattern (every other pixel will be dark).

There are different methods to obtain the proper video signal, depending upon whether the video source is black and white, or color. In each case, a Truevision VIDI/O Box (or a Sony Frame Store) is required.

A black and white video camera that produces an NTSC Composite Video signal must be connected to a Truevision VIDI/O Box in order to produce the RGBSync signals that are required for pass-through video display. A five-lead BNC-to-DB9 cable should be used from the VIDI/O Box to the ATVISTA board. The NTSC composite black & white video signal is supplied to the input terminal of the VIDI/O Box and the RGBSync signal is obtained at the output. The Alpha lead must be connected to video

loop output of the VIDI/O Box to obtain black & white images. The black and white composite video signal is then passed directly to the Alpha channel input (Turn off the 75-ohm video input termination on the VIDI/O Box).

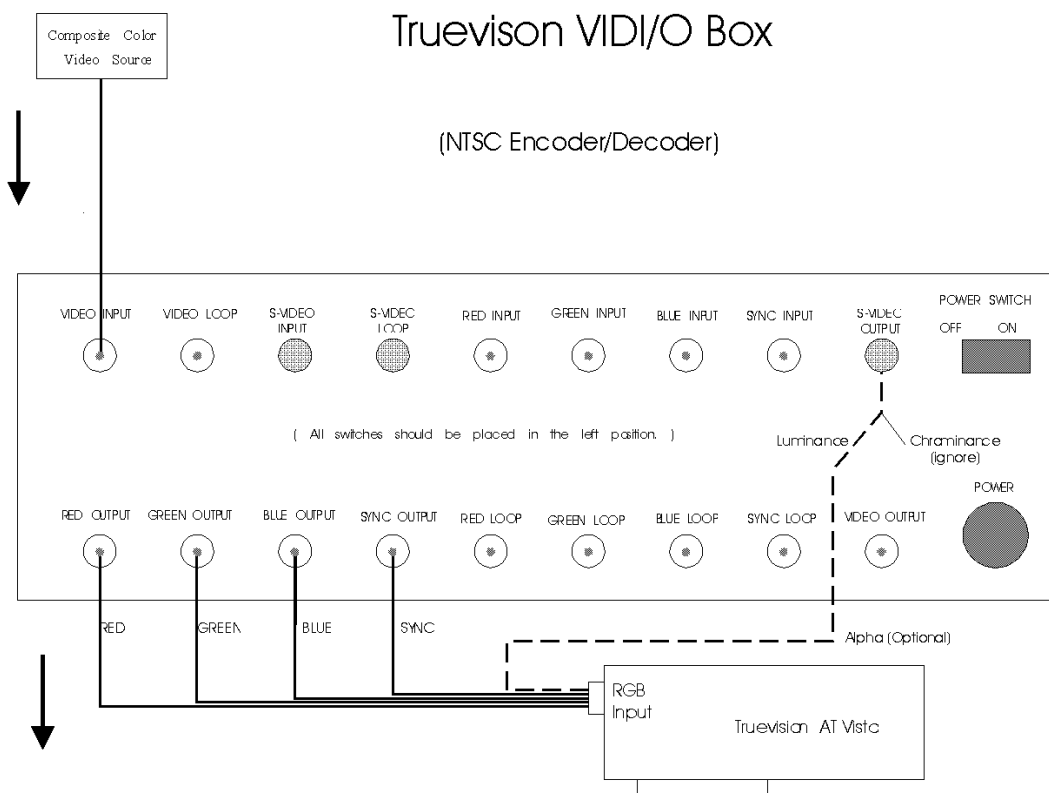
If it is necessary to capture both color and black and white images from the same source (e.g., to obtain color images for the medical record and monochrome images for later image analysis), a slightly different setup must be used.

For a color video source, the alpha lead must be connected to a monochrome signal produced at the S-Video Y (luminance) output. A S-Video-to-female BNC connector must be used.

If the source produces an NTSC color composite video signal, the RGBSync leads should be connected to the RGBSync outputs. If the video source produces RGBSync signals, it should be connected to the RGBSync input of the Truevision VIDI/O Box, and the RGBSync leads to the ATVISTA board should be connected to RGBSync Loop.

For Color Video Sources, the Alpha lead must be connected to a monochrome signal produced at the S-Video Y (luminance) output. An S-Video-to-Female BNC connector must be used.

If the source produces an NTSC Color Composite Video signal, the RGBSync leads should be connected to the RGBSync outputs. If the video source produces RGBSync signals, it should be connected to the RGBSync input of the Truevision VIDI/O Box, and the RGBSync leads to the ATVISTA board should be connected to RGBSync Loop (See Figure 3.2 for more details).



Configuration for Color and Black & White
using a Composite Video Color Source

Figure 3.2 Configuration of Color and Black and White using Composite Video Color Source

3.1.2.4 VHS Video Tape

VHS Video cassette recorders (VCRs) store analog images at half of the NTSC resolution. For some applications, it is necessary to use VCRs. Some services will want to use VCRs in case **VISTA** or their workstation is down. A videotape input workstation can probably be shared among services.

Meteor: The Meteor board can process the signal directly from the VCR. On the **VISTA** Imaging Capture Configuration Window, select an option that contains "VCR ON".

ATVISTA: The ATVISTA board requires a Sony MPUF-100 Frame Store in order to properly synchronize the VCR video signal when it is in freeze-frame mode.

Sony MPU-F100 Frame Memory Unit

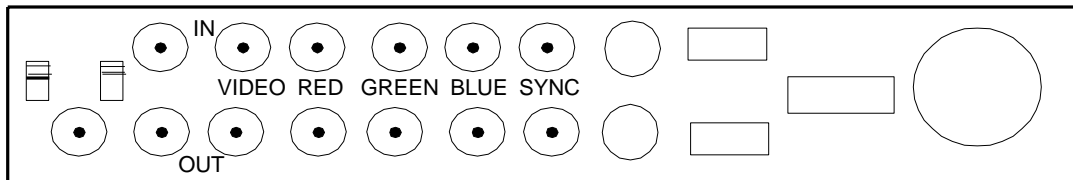


Figure 3.3 Sony MPU-F100 Frame Memory Unit

The MPU-F100 is a frame memory/frame synchronizer unit that can be connected to VCRs. It grabs the picture in memory and can add picture effects (i.e., image tiling, several to a page). It also works as a time base corrector to offer pictures without jitter or skew errors.

When used with VCRs, the Frame Store synchronizes the input video signal with the reference video signal. The video IN connection is made between this unit and the VCR. The OUT connections are made between the red, green, blue and sync to the Truevision ATVISTA board (port marked IIn).

A cable is connected between the "video out" connector of the VCR and the "VIDEO IN" connector of the Sony Frame Store unit (see figure 3.3). Another cable is then attached to the Red-Green-Blue-Sync BNC output connectors of the Frame store unit. This cable is fed directly to the "INPUT" connector of the ATVISTA board in the imaging workstation.

Alternatively, you may want to use a T-switch. This will allow convenient switching between input sources, and requires only one workstation. Feed the BNC-to-9 pin cable coming from the processor box into a 9-pin T-switch. The second input to the T-switch will come from the VCR interface described in section 6.4.1. The output of the T-switch will go via 9 pin-to-9 pin cable to the "INPUT" connector of the ATVISTA board.

3.1.2.5 GI Endoscopy Interface Installation

Your GI laboratory must be using a video endoscopy unit in order to capture and digitize GI images. Fuji and Olympus units have been interfaced thus far to the

VISTA Imaging System. There are two ways to acquire the image signal from video endoscopy equipment:

- The endoscopy unit may have a processor box (Fuji for example) which provides Red-Green-Blue-Sync analog output directly from four connectors, generally located on the back of the unit (see Figure 3.4). This output can be fed to the ATVISTA or Meteor board “INPUT” connector on the imaging workstation using a BNC-to-9 pin cable.

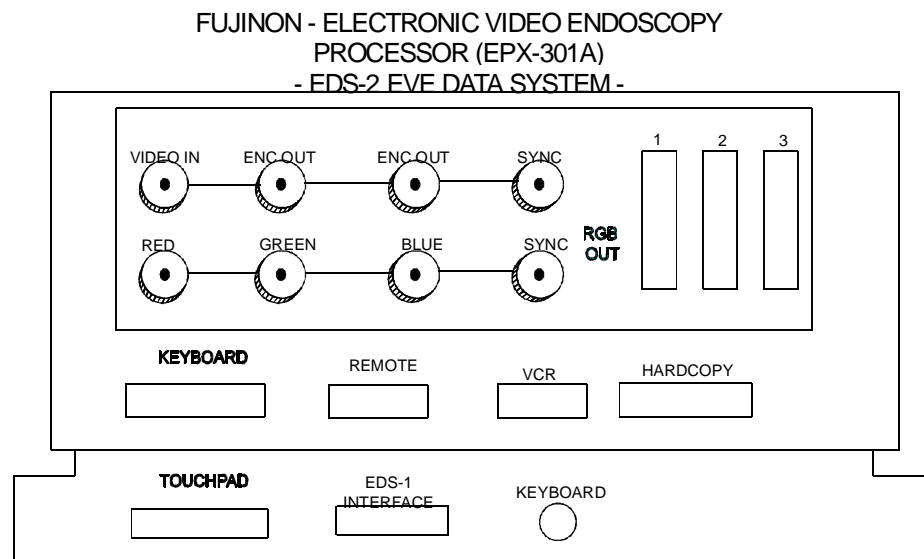


Figure 3.4: Connect cables to “RGB OUT” connectors on lower row of endoscopy processor box, labeled RED, GREEN, BLUE, and SYNC.

- The endoscopy system will also display live video images on a monitor. The Red/Green/Blue/Sync signals can be obtained from the back of the endoscopy video monitor and passed directly to the ATVISTA board input connector located in the imaging workstation. A five-lead BNC-to-DB9 cable should be used. The fifth lead, the alpha channel, should not be connected.

WARNING: Because of the invasive nature of the endoscopy procedure, the VISTA imaging workstation connected to endoscopy equipment must have an isolation transformer with less than 100 microamps leakage.

It is also possible to capture the endoscopy procedure to videotape first, and then review the case to select still images for capture and distribution. This is not normally preferred because image fidelity is lost in the videotaping process (VHS video cassette recorders (VCRs) store analog images at half of the NTSC resolution); videotaping followed by capture requires more time. However,

you may want to use VCRs in case **VISTA** or the imaging workstation is not functioning (see the section on VCR interface instructions).

Note: Olympus EVIS systems do not support direct interfaces to VISTA Imaging at the present time. You will need to separately capture images to VISTA from the EVIS display monitor. Any future purchases should require DICOM interfaces.

3.1.2.6 Bronchoscopy Interface Installation

METEOR: To interface an Olympus Bronchoscope system, attach a cable to the “video out” single BNC connector on the Olympus processor box. Connect the end of this cable to the RCA jack on the Meteor board. In the **VISTA** Imaging Capture Configuration Window, configure the Meteor for Color, NO VCR, Composite. Use test mode to check your installation.

ATVISTA: To interface an Olympus bronchoscopy system, attach a cable to the “video out” single BNC connector on the Olympus processor box. The other end of this cable should be connected to a VIDI/O box at the “video in” connector. Then a RGBS cable should be used to connect from the Red, Green, Blue, and Sync connectors of the VIDI/O box to the ATVISTA board, “INPUT” 9-pin connector in the workstation.

3.1.2.7 Cardiac Catheterization Laboratory

Images have been successfully captured from Vanguard film viewing stations, which include video cameras, and from Siemens Cath Lab Systems. In the case of the Vanguard film viewing station, images are generally captured at the time the procedure report is written. The Vanguard viewer’s black and white video camera outputs an NTSC composite video signal.

METEOR: Attach a cable to the Vanguard’s connector at one end and the Meteor’s RCA jack at the other. In the **VISTA** Capture Configuration Window, configure the Meteor for Color, NO VCR, Composite. Use test mode to check your installation.

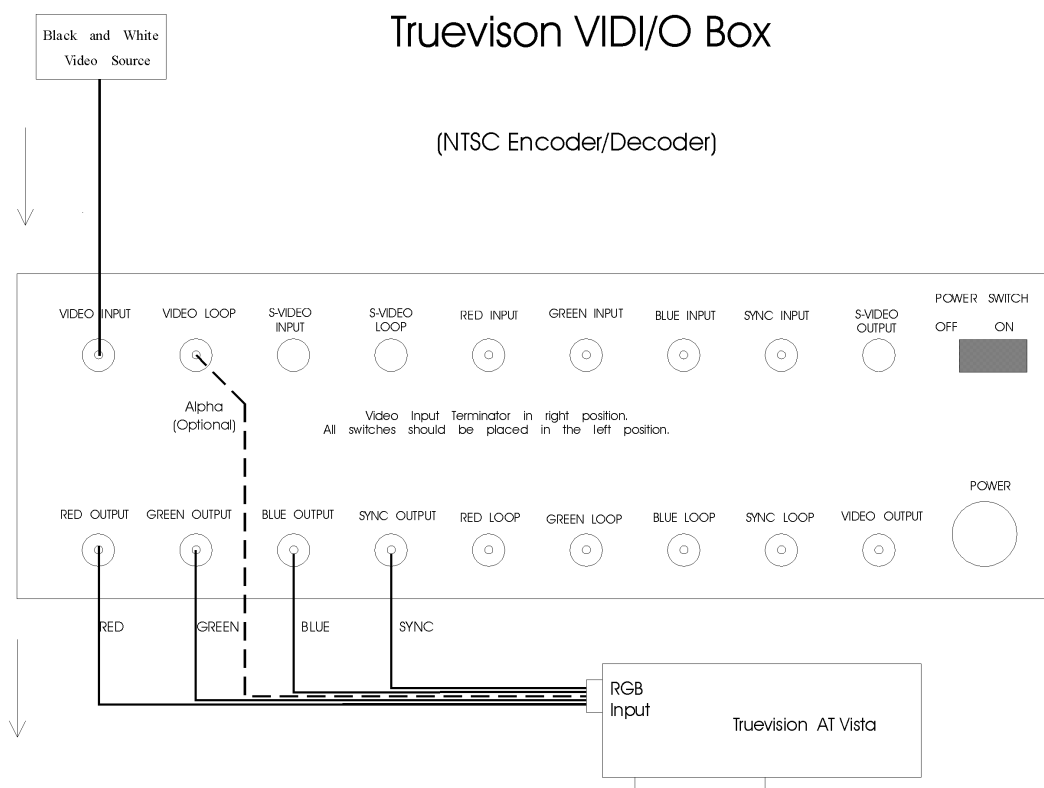
ATVISTA: This must be connected using a 75-Ohm BNC cable to a Truevision VIDI/O box at the input terminal labeled “VIDEO INPUT” (see Figure 3.5).

The ATVISTA board requires RGBSync signals for pass-through video display. Therefore, a five-lead BNC-to-DB9 cable should be used from the VIDI/O Box to the ATVISTA board. The Alpha lead must be connected to the video loop output of the VIDI/O Box to obtain black and white images.

The black and white composite video signal is then passed directly to the Alpha channel input via “video loop” output (Turn off the 75-ohm video input termination on the VIDI/O Box). The Red, Green, Blue, and Sync lines need to be connected to the Red, Green, Blue, and Sync outputs.

Direct interfaces to radiology DICOM compliant devices are under development, but are not part of **VISTA** Imaging V. 2.0.

The Siemens Cath Lab system allows capture of images during the procedure. You will need to contact Franz Sattler of Siemens Cath Equipment at 1-800-888-7467 for information about connecting your Siemen Cath Equipment to the **VISTA** Imaging workstation in a manner similar to that done at the Washington DC VAMC.



Configuration for Color and Black & White using a Black & White composite video source

Figure 3.5 Configuration for Color and Black and White using a Black and White Composite Video Source.

3.1.2.8 Echocardiography (Echo)

Two methods have been used to capture echocardiography images. Echo images are best captured during the procedure because the image quality is best and the least amount of time is required of the technologist. This is done by pausing the ultrasound machine (Also done for making annotations). At this time, the user can press <**RET**> on the imaging station to capture the image.

To interface all new ultrasound devices, use the Red-Green-Blue-Sync connectors on the back of the main processor of the echo/ultrasound system. Connect these using a BNC-to-9 pin cable to the Meteor or ATVISTA board in the workstation directly. This method captures a color image and is the preferred method.

If the above method cannot be used, you will need to acquire images from the video tape unit attached to the echocardiograph system. Attach a cable to the "video out" single BNC connector on the rear of the VCR that is connected to the echocardiography machine.

METEOR: Connect this cable to the Meteor board's RCA jack and configure for BW, VCR ON, composite.

ATVISTA: Connect this cable to a Sony Frame Store unit at the "video in" connector (see Figure 3.3). From the Frame Store, use a BNC-to-9 pin cable to connect the four Red Green Blue Sync BNC connectors to the "INPUT" connector on the ATVISTA board.

Note: The quality of the video cassette recorder greatly determines the quality of the video signal presented to the image capture workstation.

3.1.2.9 Nuclear Medicine Medisys Interface

A frame grab can be done by connecting to the back of the viewing workstation. Please contact us if you are trying to interface to a different nuclear medicine system.

3.1.2.10 Microscope Interfaces

3.1.2.10.1 Mounting a camera on a microscope

Image capture from a microscope requires the use of a video camera (without lens) on the camera mount of the microscope. Video cameras generally have a "C" mount. You will need an adapter for the microscope to mount the camera. These are often commercially available from the microscope vendor or from third parties. It is

important that the final assembly be "parfocal," (i.e., the image that is in focus when viewed through the oculars is in focus on the video monitor).

Some departments will already own video cameras for at least one microscope in their service. This may be used during conferences, and will still be required to serve this function. It is often possible to take a RGB analog signal off of the display monitor's output connectors. In this case, you will probably need a 9-pin to BNC cable. Connect the RED, GREEN, BLUE and SYNC BNC connectors to the monitor output connectors labeled R, G, B, and S. Attach the 9-pin connector to the Meteor or ATVISTA board "INPUT" connector. See section on Color Video Cameras for interfacing instructions.

3.1.2.10.2 Testing the Microscope Lighting and Connection to Cameras

To test the interface, use the test mode of the **VISTA** Imaging Capture window. Position a glass slide on the microscope stage and select a microscopic view. Be sure that the video camera attached to the microscope is turned on. At this point, the image on the microscope will appear on the image screen of the workstation. You should focus the image on the monitor. You can check to see if the setup is parfocal by looking at the image under the microscope. The light intensity required for viewing in the microscope may be too great for the camera optics, so you should adjust the light to produce a good-quality image on the monitor. If the image-screen is dark, then the video camera is probably turned off or the cable is not connected correctly. If your interface is to a video monitor, you should also see the image there.

3.1.2.10.3 Black and White Image Capture

There are some microscope specimens which are better captured in black and white. These should be captured using the Black & White (8-bit Gray Scale) Capture option, since the number of gray levels saved (256) is much greater than the number of gray levels in the color image option (32). If your users are interested in research projects involving image analysis, 256 gray levels represent the current standard for research publications. A somewhat different interface method is required for black and white capture. See the section on Black and White Image Capture for interfacing instructions.

3.1.2.11 Dental Intraoral Probe Interface

The Dental imaging workstation is configured as follows:

The Dentsply-Perspective 2 Intraoral Camera system (video device unit that is also a light source) has a BNC video out jack which connects to the JVC Character Generator CG-V60U - to the RCA video in connector. It has an RCA video out

connector which connects to the Panasonic Color Video Printer, model AG-EP60 via BNC video in connector. This unit has a BNC video out connector which connects to the Meteor board or VID/I0 box for an ATVISTA board. (See color video camera section.)

The 2-pedal foot control unit provides remote control capability for “tiled” images. It has a wire that connects to the “remote control” entry of the Panasonic Color Video Printer.

When using the ATVISTA board, in order to fit everything onto the cart, you will need to use the Sony PVM-1340 Trinitron Color Video monitor for imaging workstation display. It has Red-Green-Blue-Sync BNC connectors which can be cabled using 9-pin-to-BNC cable to the ATVISTA board “OUT” connector. The PVM-1340 has a superior image and is preferred by many users.

Users can use the workstation in any of three basic modes described below and further in this manual.

- Image capture mode using the Image Capture option to capture live patient images
- Image display mode using either the Integrated View/Visual Chart option, or the medicine package
- Live conferencing mode using the Live Conference option

The dental cart from the company is sturdy and has a small footprint. If this is used, the character generator is on a sliding panel that is drilled to fasten to the bottom surface of the top shelf. The intraoral camera “holder” is drilled to fasten to the side of the top shelf.

The top shelf has the imaging monitor and the keyboard. The next shelf has the text monitor and behind it the VIDI/O box. If you are using a **VISTA** Board, the bottom shelf has the light source, on top of the VCR which is on top of the PC chassis. The foot pedal is also stored on the bottom shelf when not in use.

Two surge suppresser strips are needed to handle all of the connectors. These can be tied to the sides of the wagon with plastic ties.

All of the communication and power cables are routed and tied to prevent damage and have a “non-threatening” appearance to the user.

The power cord and the Ethernet cable are looped to a “VA fabricated” holder -- each uses a bolt and nut which fastens a large washer to the top shelf in the rear of the wagon. The washer is drilled to accept a chain and, at the end of the chain, is a

“figure eight” hook. This enables the user to coil the cables individually and hook them to the back of the wagon.

For security, a cable lock is used to fasten all items, except for the VCR and light source that use a specially fabricated steel cable to connect them to each other and the wagon.

These last items have been found to be especially helpful in providing maximum security.

3.2 Still Video Cameras

Still video cameras are an alternative to the color video cameras previously described. A major advantage is that they are completely portable and can be used to take hand-held pictures. With a Still Video Camera, the camera can be taken to the patient, not the patient to the camera. In addition, they can produce higher resolution images.

Many still video cameras record images on a PCMCIA card, and play them back into the computer. This may be done in several ways:

- A TWAIN interface
- Proprietary software which places the files on the local workstation
- By reading the files directly from the PCMCIA storage device.
- Some cameras have a composite video output, which can be passed directly to an image capture board.

In order to use the second or third approaches, the image files must be in a standard format.

You will need to install the software that came with the camera. Follow the vendor's instructions for setting up the camera and connecting it to the PC.

- If downloading capability is provided, after downloading images, use the **VISTA** Capture Window's import mode to import an image. This will tell you if the vendor is using standard file format.
- If no download capability is available, you will need to use the TWAIN input mode described in the next section. Generally, this is slower for the user but still practical.

Note: There recently have been new developments in the area of digital video cameras that can capture motion or still images. Please contact the Imaging staff for the latest information if you are considering buying a still video camera.

3.3 TWAIN Devices

3.3.1 Configuring a TWAIN Device

TWAIN interface software is device specific and is provided by the vendor. It should be installed with the device's software.

After installing the software supplied with your TWAIN device, select an option from the TWAIN capture list in the **VISTA** Imaging Capture Configuration Window. The first choice, TWAIN Device, is general and will allow the user to configure the device at each use in a TWAIN interface window. You will probably want an Image Type of Truecolor (either TGA or JPG). If your camera has a resolution higher than 768 x486, you will probably want to use JPG.

The other options are:

- HP Scan Jet 4C X-Ray
- Scan ECG
- Scanned Documents
- Vidar/Howtek

Note: These options are pre-configured as described in the Imaging V. 2.0 User Manual.

3.3.2 Color Page and Transparency Scanners

Any scanner with a standard TWAIN interface can be used as an input device to the Imaging system. The scanner will normally connect via a SCSI cable to the workstation that has onboard SCSI. We strongly recommend single-pass color scanners because the scanning time is about one third of a three-pass camera. Also, some lamps are cooler and turn off when not in use to prolong the lamp's lifetime. Some scanners automatically adjust to the paper size. Some may provide special color-matching software. The resolution and scan modes required will depend on the types of images to be scanned. Interpolated resolutions are calculated based on the highest scanned resolution.

3.3.3 Slow Scan Video Cameras

These cameras produce a very high-resolution image (i.e., up to 2000x 3000 pixels at 24-36 bits). However, they require one to ten minutes to complete a scan and save

the image file. They are only useful for acquiring images that will not change (i.e., pathology slides, radiology or cardiology films). These should have a TWAIN interface (See instructions in the previous sections for TWAIN devices).

In the future, there may be cameras which combine slow scan capability with live video, improving the functionality of these cameras.

3.4 Laser X-ray Film Digitizers

3.4.1 Configure Hardware and Install Drivers and Software

Configure the digitizer according to the manufacturer's instructions. Digitizers usually require a SCSI card or a proprietary card to transfer data from the digitizer to the workstation that will capture images. To operate with **VISTA** Imaging, the scanner must provide either TWAIN interface software, DICOM interface software, or Lumisys proprietary software by Lumisys Incorporated.

Several vendors have TWAIN-compliant X-ray scanners. These are capable of digitizing 8-bit or 12-bit pixels; however, the **VISTA** Imaging Capture window can only accept 8-bit images in Imaging V. 2.0.

3.4.2 Testing Scanner Software

TWAIN scanner software can be tested with the **VISTA** Imaging software or with off-the-shelf scanner software, including Adobe Photoshop by Adobe Systems, Inc. .

Lumisys scanners can be tested by running the appropriate .BAT or .PIF file; either SCAN75.PIF or SCAN150.PIF.

3.5 Electrocardiogram System Interface (ECG or EKG)

Capture of electrocardiograms currently requires an interface to the Marquette MUSE system. This software is still in alpha test and is not included in this distribution.

Chapter 4 Workstation Furniture and Physical Security

4.1 Stationary Display Workstations

Some display workstations will be placed directly on work surfaces in areas such as ICUs, emergency rooms, and ward offices. In this case, you will need to be sure that the workstation is protected from spilled liquids; we have used plastic keyboard protectors for this purpose. We generally have placed the PC chassis on the surface. However, it can be mounted vertically.

In other locations, it is necessary to use commercially-available computer furniture. The furniture must be wide enough to accommodate the monitor(s); also, good airflow is important. Some commercial furniture will lock closed when not in use. In special circumstances (i.e., extra large display monitors for conference rooms), custom furniture must be built.

4.2 Mobile Display Workstation

Image capture workstations generally must be located near the patient in the procedure area and often must be able to roll around within a limited distance. In some cases there must be access to connect and disconnect the input device. We have used carts with two or three shelves and wheels for this purpose in a number of clinical areas. The display image monitor is on the top shelf, where it is easily seen. For ATVISTA sites, the VGA monitor is on the middle shelf. A keyboard drawer is used on the middle shelf. The PC chassis is on the bottom shelf with any essential interface equipment.

4.3 Electrical Power Isolation Transformers

Workstations that are connected to invasive image capture equipment (i.e., operating room or endoscopy suites) should be equipped with electrical power isolation transformers. The isolation transformer should be able to supply at least 800 watts, maximum power. The maximum leakage current permitted is 100 microamps. Check with your Biomedical Engineering Department for isolation transformers and for leakage testing.

4.4 Securing Workstations

It is very important to secure the workstation components with security devices such as lock-down cables. The Imaging team has used kits (Secure-It) where the cable simultaneously keeps anyone from opening the PC chassis and attaches all components to a permanent part of the work surface or furniture.

Chapter 5 Troubleshooting

5.1 TCP/IP Troubleshooting

Verify that the TCP/IP protocol is properly configured on your system by looking at the network properties. Confirm that TCP/IP protocol is in the list of protocols, and verify that it is configured with an IP and gateway address. The gateway address must be on the same subnet as the workstation. The VA currently recommends using a 9-bit subnet mask (255.255.255.128), which means that a subnet range of addresses can be 152.1xx.yyy.1 to 152.1xx.yyy.126 or 152.1xx.yyy.128 to 152.1xx.yyy.254.

e.g., When a site is assigned a subnet range of 184-185, they will divide their subnets as follows:

Subnet 1 - 152.128.184.1 to 152.128.184.126

Subnet 2 - 152.128.184.128 to 152.128.184.254

Subnet 3 - 152.128.185.1 to 152.128.185.126

Subnet 4 - 152.128.185.128 to 152.128.185.254

Be sure to choose the router or gateway address on the same subnet as your workstation IP address. You can use the PING and TRACERT applications from the command prompt to test the connection.

5.2 RPC Broker Troubleshooting

The broker Developer Infrastructure team has a web page with information on the Broker, including a FAQ and troubleshooting section. Use www.vista.med.va.gov or <http://152.127.1.95/index.html> to get this web page.

5.2.1 Broker Client Manager Workstation Troubleshooting

The following is a list of possible broker errors on the workstation (These errors will be displayed in an information window):

ACTION: send

ERROR CODE: 10061

ERROR MNEMONIC: WSAECONNREFUSED

Possible problem (can be one (1) of the following):

- TCP Listener on DHCP is not running.
- Client Manager was not installed on the workstation.

ACTION: Gethostbyname [DHCP]

ERROR CODE: 11004

ERROR MNEMONIC: WSANO_DATA

Possible problem (can be one (1) of the following):

- HOSTS. file does not exist.
- The file has been saved with a file extension.
- None of the IP addresses have DHCPSEVER as their name.
- No carriage return after last entry in the host file.

ACTION: send

ERROR CODE: 10054

ERROR MNEMONIC: WSAECONNRESET

Possible problem:

- The job has lost its connection to DHCP.

ERROR could not be saved; RPCBI.DLL form has not been created probably because the DLL did not initialize or Client Manager could not be started.

ACTION: Run Client Manager

ERROR CODE: 20103

ERROR MNEMONIC: Path was not found

Possible problem (can be one (1) of the following):

- The VISTA\BROKER directory was not found.
- The Kernel Broker Client Manager software is not installed on the workstation.

5.2.2 RPC Broker Troubleshooting on the VISTA/DHCP Alpha Server

Please follow the instructions provided in the latest Kernel Broker user manual. If

you experience any Broker problems on the **VISTA** /DHCP alpha server, contact the Broker support team.

5.2.2.1 How to Stop the TCP Listener

```
>D STOP^XWBTCP(9200)
```

Stop TCP Listener...

TCP Listener does not appear to be running.

5.2.2.2 How to Start the TCP Listener

```
>D STRT^XWBTCP(9200)
```

Start TCP Listener...

TCP Listener started successfully.

5.2.2.3 Check the System Status for the TCP Listener

```
>D ^%SY
```

```
20600169 DSM$_JOB_00100 HIB      VAH,ROU XWBTCPL
```

Note: Sites have experienced problems with the TCP Listener. The job may be up and running but still does not allow workstations to log on. If you experience this, follow the steps to stop the TCP Listener. If this process hangs, there is a problem with the listener. You may need to FORCEX the job running (XWBTCP) and restart the TCP Listener.

5.3 Windows NT Image File Server Troubleshooting

Troubleshooting the NT Image file server involves reviewing the initial installation and being knowledgeable of network configuration and hardware, as well as platform structure. The most likely problem would be with the directory's share permissions and/or the user/group profiles created for Imaging users. Review the earlier chapters regarding installing the NT Server software. If a server (disk drive) is made unavailable, remember to edit the entry in the Network Location (2005.2) to prevent errors when displaying images from this server.

5.3.1 Editing the Network Location Status Field

The Network Location file keeps track of whether the server it refers to is online or offline. This is very useful in case of a malfunction or scheduled repair on that server. The Imaging software will check this field when retrieving files. If a unit is offline and there is a jukebox on the system, the file will be automatically retrieved from the jukebox. If there is no jukebox, the file will not be retrieved. However, the workstation will handle the situation gracefully.

To change the status for a network location, select the “Edit Network Location STATUS” from the Imaging System Manager Menu. You will see the following:

```

CHANGE a Magnetic Server STATUS
OFF LINE =====> 0
ON LINE =====> 1
Select NETWORK LOCATION: MAG1      U:\IMAGE
OPERATIONAL STATUS: ONLINE// 0 OFFLINE

```

Note: Select “0” to indicate that the unit is offline; 1 to indicate it is online and operational.

5.4 VISTA Imaging Software Troubleshooting

Users may encounter several types of errors as they use Imaging V. 2.0. Some errors are processing errors, which means that Imaging V. 2.0 failed to complete a processing task.

For example, when displaying a report and the device “WORKSTATION” can not be opened, the Imaging software will display an information message on the report text window regarding this error.

Others are data errors, which mean that Imaging V. 2.0 attempted to use data that was incomplete or formatted incorrectly. Imaging software relies heavily on API's or report routines developed by the other **VISTA** applications that are interfaced (i.e., Medicine and Laboratory). It is possible to reference a report that has been deleted on the interfaced **VISTA** application. However, the Imaging application will display an information message regarding this error.

When displaying a text report and a blank report is displayed, there is a problem with the called routine or the circumstances mentioned above may exist. The **VISTA** error trap routine should have recorded the error.

Please contact the Customer Support Desk Imaging Specialist for support. In addition, a mailman message can be sent on FORUM to the G.IMAGING

DEVELOPMENT TEAM.

5.5 Imaging Workstation Troubleshooting

The Imaging application is split into two different parts:

- Display software
- Capture software

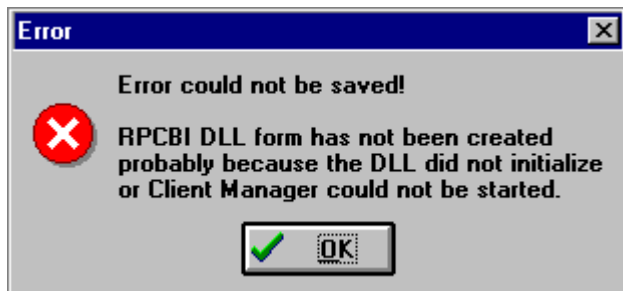
As discussed in previous chapters, the Display software can run on Windows 95 and Windows NT, and is based on a Pentium and Pentium Pro (P6) system(s). The Display software requires at least 4MB RAM (or better) on the video adapter. The Capture software has the same requirements with an additional component of an image capture device. Troubleshooting an Imaging workstation requires a working knowledge of personal computer components, as well as the NT network platform.

5.5.1 Imaging Display Workstation

Probable situations:

- When clicking on the application, the Broker Sign-on window (access/verify code prompting) does not appear; however, you get the following informational message:

“The Kernel Broker Client Manager software has not been installed on the workstation.”



- The Imaging application requires the “MAG WINDOWS” menu option assigned. The following message text will appear if a user does not have this menu option.



- The EGCHO program can be used to test the Broker Client Manager's connection to the **VISTA** servers. This program is located in the **VISTA** \BROKER directory. Executing this program should immediately display the **VISTA** access/verify code Sign-On window. If the window does not appear, it is possible that one of two conditions may exist:
 - ❑ The TCP Listener routine is not running on the **VISTA** server
 - ❑ An invalid IP address and/or listening port number has been defined in the HOSTS file (This file is located in WINDOWS directory for Windows 95 or WINNT\SYSTEMS32\ DRIVERS\ETC directory for Windows NT environment).
- If the EGCHO program was unsuccessful, review Section 5.3 of this manual for "TCP/IP Troubleshooting." Use the PING or the TRACERT programs providing the IP address defined in the HOSTS file. If the EGCHO application can not connect to the **VISTA** server, the Imaging application will not work.
- If an Imaging workstation does not display images, is it for a particular patient or is it on all patients? Here are the possibilities:
 - ❑ If the problem is with all patients, then the problem could be that the workstation has not been properly assigned rights. Review the sections "Creating Imaging users and groups" and "Creating directories and shares".
 - ❑ If the problem is on one patient, review the entry in the Imaging file (2005). Check the network directory where the files reside and review the share privileges. Check the drive's STATUS field in the Network Location file. If it is off-line, check with the network administrator.
- If images can be viewed on another workstation, compare the MAG.INI file for both workstations. Review Section 2.4.6 of this manual for "Edit the Imaging workstation parameters file with MAGSYS tools". Is NT file security setup?

- If an imaging workstation displays the message, “Error in connecting to server”, it was unable to make the security connection to an image server. The following table contains error codes that may be displayed, the associated translation, and possible causes of the problem that generated the error code.

Error Code	Translation	Possible Causes
6	BAD PASSWORD	<ul style="list-style-type: none"> • Password supplied is wrong. Site parameters should be checked. • Security is not turned on for this workstation. • Individual user may not have an account on the image server.
7	ACCESS DENIED	<ul style="list-style-type: none"> • Password supplied is incorrect. Site parameters should be checked. • Security is not turned on for this workstation. • Individual user may not have an account on the image server. • User is not in image users group. • Image users group does not have access to image share. • Network location path is not accessible. Server may be down or network connectivity is interrupted.
11	OUT OF MEMORY	<ul style="list-style-type: none"> • Workstation does not have enough memory. • Too many applications are open at one time.

5.5.2 Imaging Capture Workstation

Probable situations:

- The capture workstation is hardware dependent on the video capture board installed. Please review the manufacturer’s troubleshooting documentation.
- Message text “Can’t save the *filename.ext*” is displayed when an attempt to save (write) the image file to the current write location failed. Possible reasons could be:

- ❑ Not enough space on the disk to write the file. Check the disk space and change the current write location by using the “**Edit Image WRITE LOCATION**” menu option from the **Imaging System Manager Menu**.
- ❑ The workstation has lost connection to the current write location. Log in as administrator. Use explorer and map a drive to the imaging Share. Consider the following:
 - Question: Does the workstation connect to the network?
Answer: Check the network card.
 - Question: Is there a status link light and is it flashing?
Answer: The network card’s light indicators are manufacturer dependent (Review the manufacturer’s documentation for troubleshooting).
 - Question: Is the workstation routed through a router? If so, were changes made to the router?
Answer: Test the IP address by using the PING or TRACERT programs.
- ❑ Review the network shares and permissions for the current WRITE location. The disk/directory may not been setup to allow file creations. Contact the network administrator.

5.6 Background Processor / DDP Troubleshooting

The option “Start Background Processor” on the Background Menu will start the processing of queues in the ^MAGQUEUE(2006.03 global. The routine uses the workstation’s system name to look up the entry in the Imaging Workstation file (2006.8). If the entry does not exist or the field BACKGROUND PROCESSOR has not been set to YES, the process will display an informational message and quit.

The background processor uses DDP to connect to the **VISTA** server. If a DDP connection is not made, the processor will error out with some of the following errors:

- <NOSYS> - Indicates no DDP circuits were established.
- <DSTDB> - Indicates there is a problem with the DDP link circuit configuration or, if a global reference was made, a translation table entry may be incorrect.
- <PROT> - Indicates a global access privilege on the host **VISTA** server has not been modified to allow the background process access.

5.6.1 Link Problem - M Cannot Communicate with the Ethernet Card in the Workstation

MSM/PC requires the NDIS2 protocol for the Ethernet card. Be sure that your card supports this protocol.

5.6.2 Circuit problems - You Cannot Connect to the Host Systems (Unreachable)

The circuit definition may not be correct. To verify this, use SYSGEN to allow automatic configuration. You should see circuits to all systems on the network (if not security protected). Use ^DDP in MGR UCI to view circuit information. This will indicate to you the Ethernet addresses to which you have connected. In particular, you will need to verify the Ethernet address entered under SYSGEN.

Security is set up on the **VISTA** host system and not set up on the workstation. If the security password is enabled on the host **VISTA** system, you must enter the password on the workstation using SYSGEN under DDP Configuration, Network Security. Similarly, if security password protection is enabled on the workstation, it must be enabled on the host.

If you find that the circuit is enabled but unreachable, this may be because the two systems belong to different DDP groups. You should check the groups option on the workstation under DDP Configuration, DDP Groups. The workstations may be assigned to one or a set of groups:

e.g., **Groups 0-15** - The group(s) on the workstation must contain the group of any host systems to be connected to. The default is group 0. Sites that have recently converted to Alphas may find that their Alphas are set to group 15.

Reminder: Be sure to check the groups on your host systems.

Under automatic configuration, you may see an error indicating that you don't have enough buffer space. Sometimes bringing DDP down and up will cause different systems to connect. You want to see if you can get the systems that didn't connect before to connect. You also will want to verify the Ethernet addresses and make sure they match what was entered into the Circuit Definition under SYSGEN.

Under SYSGEN DDP System Parameters, the number of DDP buffers and the maximum number of DDP circuits parameters must be large enough. These numbers must be larger than the number of **VISTA** host systems to be connected.

DDP requires a partition in which to run. If your workstation does not have enough memory available, DDP cannot be started. You can confirm this by using ^%SS to see if your DDP job is running after starting up DDP.

5.6.3 Editing the Workstation File

The Enter/Edit Workstation File option will allow you to enter workstation configurations into File #2006.8. The background processor routines use this file to verify that the workstation can execute the background processor routines. The following is a script of an editing session (Responding with a “?” will provide on-line help for each field).

```
Select OPTION NAME:      MAG SYS-ENTER/EDIT WORKSTATION      Enter/Edit Workstat
ion File
Enter/Edit Workstation File

Select IMAGING WORKSTATIONS NAME: BPA
NAME: BPA// <RET>
BACKGROUND PROCESSOR: YES// <RET>
ABSTRACT: NO// <RET>
JUKEBOX: NO// <RET>
JBTOHD: NO// <RET>
*FILECOPY: <RET>
*EXPORT64: <RET>
*IMPORT64: <RET>
DELETE: YES// <RET>
```

5.7 Imaging Test Tools

Review the manufacturers' installation guide and use their testing tools on Imaging components (i.e., the video board and capture board). Please review the Test Software Available for Troubleshooting section of the Imaging V. 2.0 Technical Manual.

Appendix A: Installation of Windows NT Server Software

Note: Read all on-screen prompts fully and carefully. Do not simply follow this guide step-for-step. Words that appear in bold are either keyboard keys to press, or graphical buttons to select with the mouse. If you encounter problems, consult your administrator or the Imaging Help Desk.

A.1 Initial Loading

With your computer turned off, insert the Windows NT Server Setup Boot Disk in drive A, and then turn on your computer. You will be prompted as follows:

Welcome to Setup screen...

Press **Enter** to install Windows NT Server.

Press **Enter** to choose Express Setup.

Detecting Mass Storage Devices...

Press **Enter** when prompted for additional devices.

A.1.1 Upgrading

If NT was previously installed on the system, you will be prompted for upgrading. Press **N** to install a fresh copy. Do not choose upgrade, unless given special instructions by your administrator.

A.1.2 Formatting and Partitioning Drives

A.1.2.1 General Procedure

Note: If you have more than one hard drive in the computer, see the addendum on creating volume sets in Extras section.

Follow these instructions:

1. Delete all previous partitions.
2. Highlight each partition (typically there is only one).
3. Press **D** to delete.

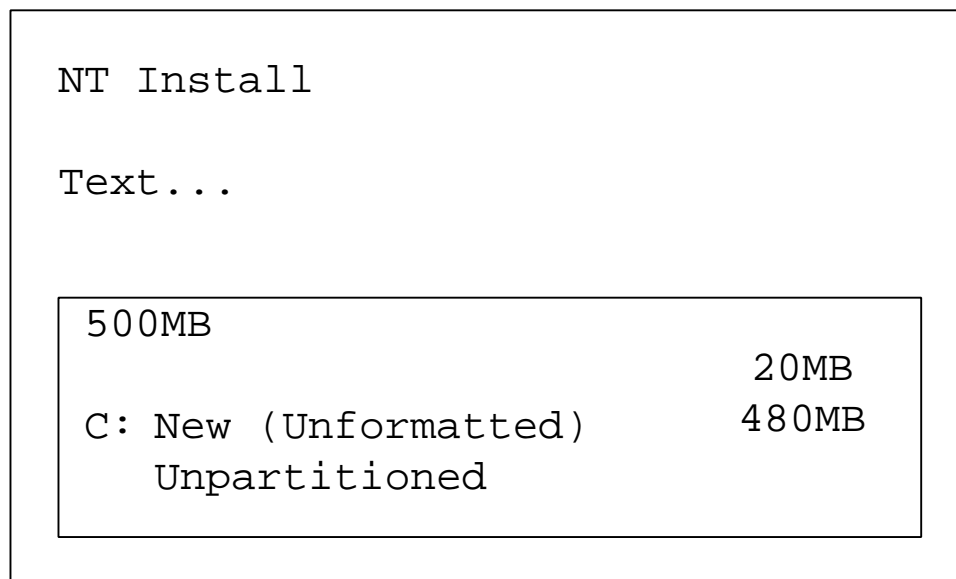
4. Press **Enter** to confirm, then **L** to finalize.
5. Repeat for all listed partitions.

A.1.2.2 Creating a DOS-FAT partition

Follow these instructions:

1. Highlight first unpartitioned volume.
2. Press **C** to create a partition.
3. Enter **20** megabytes as the size.

The screen should look similar to the figure below:



A.1.2.3 Create Multiple NTFS Partitions (One For OS boot files, One For OS, and all others for Images)

Follow these instructions:

1. Select the next unpartitioned space.
2. Choose **C** to create a partition.
3. Make the second partition 1GB (This is where the NT files will be installed).
4. Select Install partition.
5. Highlight the partition you have designated as NTFS (larger partition).

6. Press **Enter** to install NT on this partition.
7. Repeat and use remaining drive space for additional partitions (Use 2GB partitions for image directories).

A.1.2.4 Formatting the partitions

Follow these instructions:

1. Press **Enter** to format C as FAT (the 20MB partition).
2. NT will now format the 26MB partition.
3. When prompted to choose a file system, choose **NTFS**.
4. NT will now format the D: drive, however, it will not tell you that this is D: (the 1GB partition).
5. Repeat step 3 for the second NTFS partition.

Note: Formatting might take a while depending on the size of the hard drive.

A.1.3 Choosing a directory

Follow these instructions:

1. Use **\WINNT** .
2. Press **Enter**.

Note: If you are installing from CD-ROM, make sure the CD is in the computer now.

3. Follow the prompts for disks.
4. When done, remove disk, and press **Enter** to restart the computer.

A.1.4 Configuration Setup

A.1.4.1 Personalizing NT

Follow these instructions:

1. Enter your Name and Company.

2. Enter the product ID (on your registration card), and select **Continue**.
3. Server Type: If this is the first or primary image server, select **Primary Domain Controller**, and enter the new domain name according to VHA naming conventions. Otherwise, choose **Backup Domain Controller**.

A.1.4.2 Licensing Mode

Follow these instructions:

1. Choose **Per Seat**, and select **OK**.
2. Check **I agree that...**, and select **OK**.
3. Computer Name: Enter the network name for this computer (see the section on installing the Imaging server).
4. This name should be in accordance with the domain naming standards given by the VA.

e.g., If this is the second image server at the Washington VAMC, its name would be WASIMG02.

5. Language: Choose English (United States).

A.1.4.3 Printer

If a printer is attached, select its model from the list. Otherwise, select **Cancel** (printers can be installed at a later time.) If you need to change the printer setup, you can do this by clicking on the Printer Setup option. This is done in the standard Windows fashion. This is not recommended for novices.

A.1.4.4 Configuring Network Adapters

A.1.4.4.1 Detection

Review the following information/instructions:

1. NT should automatically detect your network card model. If it does, go to section 1.4.4.2.
2. If NT cannot determine your adapter model, choose **Continue** twice to obtain a list of known adapters.
3. Either choose your adapter from the list, or insert the driver disk from the

adapter's manufacturer into the floppy drive, and choose **<Other>**.

Note: NT will now copy the rest of its required files. This may take some time. Follow all disk prompts. If you used a driver disk to install your adapter card, NT may give you a "cannot copy file" error on the last disk. Simply insert the driver disk into the floppy drive, and select Retry. If you have problems, see your administrator.

A.1.4.4.2 Choosing protocols

Select all available protocols (e.g., TCP/IP and NETBEUI). NT will now copy more files.

A.1.4.4.3 Network Settings

Follow these instructions:

1. TCP/IP: Enter your IP address, subnet mask, and default gateway. This information is available from your administrator.
2. If given, select **DNS** and enter your Domain Name Server.
3. When done, select **OK**.

A.1.4.4.4 Domain/Workgroup

1. Enter either the domain or workgroup to which the computer belongs.
2. Select **OK**.
3. NT will now setup the Program Manager.

A.1.4.4.5 Administrator Account

Follow these instructions:

1. Enter a password for the Administrator account. **DO NOT FORGET THIS PASSWORD.** It is strongly recommended that another local user be added at this time. Ask your administrator if this is necessary, and what the account should be named.
2. Enter the date, time, and your time zone.

A.1.4.5 Video Setup

Follow these instructions:

1. Use the default settings.
2. Select **Test**.
3. When it finishes the test, select **OK**.

A.1.4.6 Creating an Emergency Disk (Highly Recommended)

Follow these instructions:

1. Select **Yes** to create...
2. Insert a blank disk into A, and select **OK**.

A.1.5 Finishing Install

Follow these instructions:

1. Select **Restart Computer**.
2. NT will restart twice.
3. Press <**CTRL-ALT-DEL**>, logon and you are finished.

A.1.6 Creating volume sets with two or more hard drives

A.1.6.1 Introduction

In some cases, as with very large arrays of hard drives, it might be desirable to create one very large virtual drive or “volume”. If this pertains to this system, read the Introduction to the Disk Administrator and the Creating a Volume Set section.

If this is not the case for your computer, simply format the second hard drive as DOS or NTFS, depending on your preference (See section A.1.6.2, “Intro. To the Disk Administrator, describing the NT Disk Administrator and how to perform these functions).

A.1.6.2 Introduction to the Disk Administrator

Follow these instructions:

1. From the Administrative Tools group, open **Disk Administrator**.
2. When it prompts you asking to signature unmarked drives, select ok or yes.
3. NT will now display your hard drives and partitions in a graphical manner.
4. If you followed the partitioning scheme in this document, you should see a small partition listed as FAT, a large partition listed as NTFS, and any other partitions will be listed as Unpartitioned.

A.1.6.3 Creating a partition with Disk Administrator

Follow these instructions:

1. To create a partition on an unpartitioned space, highlight the unpartitioned space (Bold black lines should indicate the partition is highlighted).
2. From the File Menu, select **Create...**
3. Specify the amount of disk space; by default it uses the entire space.
4. NT will now want to restart.
5. After restarting, re-run Disk Administrator.
6. Select the new partition.
7. From the Tools menu, select **Format**.
8. Choose FAT or NTFS, and NT will format the new partition.

A.1.6.4 Creating a Volume Set

Follow these instructions:

1. Select all unpartitioned spaces that you want to make a single volume: Hold down the CTRL key and select each unpartitioned space.
2. You should now have two or more highlighted partitions, these will become a single drive letter.
3. From the File Menu, select **Create Volume Set...**

4. NT automatically adds the total amount of space from all selected drives.
5. Select **OK**.
6. NT will now want to restart
7. After restarting, run Disk Administrator again.
8. Select the new partition.

Note: NT automatically highlights all the participating drives and partitions in the set.

9. From the Tools menu, select **Format**
10. Choose FAT or NTFS, and NT will format the new partition.

A.1.6.5 Final notes on Disk Administrator

After making changes to partitions, NT will recommend creating a new Emergency Disk. This is essential. After NT restarts, open up the Command Prompt from the Program Manager. Type RDISK at the prompt. Then, select Create Repair Disk, and follow the prompts.

A.1.7 Dial Up Networking / Remote Access Service Setup

A.1.7.1 Getting Started

Follow these instructions:

1. Open Control Panel from the Program Manager.
2. Select **Network**.
3. Select **Add Software**.
4. Select **Remote Access Service** from list.
5. Insert CD or required disks.

A.1.7.2 Setting Up the Modem

Follow these instructions:

1. Make sure the modem is connected and powered on.

2. Choose the port to which the modem is connected.
3. Choose **OK** to autodetect the modem.

If not successful...

1. Double-check com port choice, settings, and physical connections.
2. Choose your modem model from the list.
3. Select **OK**.

A.1.7.3 Configure TCP/IP

Follow these instructions:

1. Choose **Network...**
2. Turn on all protocols.
3. Choose **TCP/IP Configure**.
4. If your site does not have DHCP, choose **Use Static Address Pool**.
5. Enter the first and last IP addresses you have designated for dial-in.
6. Select **OK**.
7. Select **Continue**.
8. Insert requested disks.
9. Restart computer when prompted.

A.1.7.4 Managing RAS

Follow these instructions:

1. Open Remote Access Service group in Program Manager.
2. Run RAS Admin.
3. Highlight your server (if not selected already).
4. From menu choose **Users**; then choose **Permissions...**

5. Select each user you want to give dial-in access; then, check the box **Grant dial-in permission to user.**
6. When done, select **OK.**

Appendix B: Windows NT Workstation Installation

Note: Read all on-screen prompts fully and carefully. Do not simply follow this guide step-for-step. Words that appear in bold are either keyboard keys to press, or graphical buttons to select with the mouse. If you encounter problems, consult your administrator or the Imaging Help Desk.

B.1 Initial Loading of Windows NT Workstation Software

With your computer turned off, insert the Windows NT Workstation Setup Boot Disk in drive A, and then turn on your computer. You will be prompted as follows:

Welcome to Setup screen...

Press **Enter** to install Windows NT Workstation.

Press **Enter** to choose Express Setup.

Detecting Mass Storage Devices...

Press **Enter** when prompted for additional devices.

B.2 Upgrading

If NT was previously installed on the system, you will be prompted for upgrading. Press **N** to install a fresh copy. Do not choose upgrade, unless given special instructions by your administrator.

B.3 Formatting and Partitioning Drives

Note: If you have more than one hard drive in the computer, see the addendum on creating volume sets in Extras section.

Follow these instructions:

1. Delete all previous partitions.
2. Highlight each partition (typically there is only one).
3. Press **D** to delete.
4. Press **Enter** to confirm, then **L** to finalize.
5. Repeat for all listed partitions.

B.3.1 Creating a DOS-FAT partition

Follow these instructions:

1. Highlight first unpartitioned volume.
2. Press **C** to create a partition.
3. Enter **20** megabytes as the size.

The screen should look similar to the figure below:

NT Install

Text...

500MB	
C: New [Unformatted]	20MB
Unpartitioned	480MB

B.3.2 Create a NTFS partition (NT installation)

Follow these instructions:

1. Select the next unpartitioned space.
2. Choose **C** to create a partition.
3. Use the default size (remaining HD space).
4. Select Install partition.
5. Highlight the partition you have designated as NTFS (larger partition).
6. Press **Enter** to install NT on this partition.

B.3.3 Formatting the partitions

Follow these instructions:

1. Press **Enter** to format C as FAT (the smaller partition).
2. NT will now format the smaller partition.
3. When prompted to choose a file system, choose **NTFS**.
4. NT will now format the D: drive, however, it will not tell you that this is D: (larger partition).
5. Formatting might take a while depending on hard drive size.

B.4 Choosing a directory

Follow these instructions:

1. Use the default **\WINNT**.
2. Press **Enter**.

Note: If you are installing from CD-ROM, make sure the CD is in the computer now.

3. Follow the prompts for disks.
4. When done, remove disk, and press **Enter** to restart the computer.

B.5 Configuration Setup

B.5.1 Personalizing NT

Follow these instructions:

1. Enter your Name and Company.
2. Enter the product ID (on your registration card), and select **Continue**.

Computer Name...

3. Enter the network name for this computer.

This is the name others will see your computer as when they browse the network, if you are unsure what this should be check with your administrator.

Language...

Choose English (United States)...

Printer...

4. If a printer is attached, select its model from the list.
5. Otherwise, select **Cancel** (printers can be installed at a later time).

B.5.2 Configuring Network Adapters

Review the following information and proceed with the instructions:

Detection...

1. NT should automatically detect your network card model. If it does, go to section 5.3.
2. If NT cannot determine your adapter model, choose **Continue** twice to obtain a list of known adapters.
3. Either choose your adapter from the list, or insert the driver disk from the adapter's manufacturer into the floppy drive, and choose **<Other>**.

Note: NT will now copy the rest of its required files. This may take some time. Follow all disk prompts. If you have used a driver disk to install your adapter card, NT may give you a “cannot copy file” error on the last disk. Simply insert the driver disk into the floppy drive, and select Retry. If you have problems, see your administrator.

B.5.3 Choosing protocols

Select all available protocols (e.g., TCP/IP and NetBEUI). NT will now copy more files.

B.5.4 Network Settings

- **TCP/IP:** Enter your IP address, subnet mask, and default gateway. This information is available from your administrator. If given the option, select **DNS** and enter your Domain Name Server. When done, select **OK**.
- **Domain/Workgroup:** Enter either the domain or workgroup to which the computer belongs. Select **OK**. NT will now setup the Program Manager.

- **Administrator Account:** Enter a password for the Administrator account. **DO NOT FORGET THIS PASSWORD.** It is strongly recommended that another local user be added at this time. Ask your administrator if this is necessary, and what the account should be named.
- **Enter** the date, time, and your time zone.
- **Video Setup:** Use the default settings. Select **Test**. When it finishes the test, select **OK**.
- **Creating an Emergency Disk (Highly Recommended):** Select **Yes** to create. Insert a blank disk into the floppy drive, and select **OK**.

B.5.5 Finishing Install

B.5.6 Restart Computer

To finish installing the software, the PC will need to be rebooted and all the settings will be written to memory.

Follow these instructions:

1. Select Restart Computer (NT will restart twice).
2. Press <CTRL-ALT-DEL>, log on, and you are finished.

B.6 Extras

B.6.1 Creating volume sets with two or more hard drives

In some cases, as with very large arrays of hard drives, it might be desirable to create one very large virtual drive or “volume”. If this pertains to this system, read the Introduction to Disk Administrator and Creating a Volume Set sections of this manual.

If this is not the case for your computer, simply format the second hard drive as DOS or NTFS (depending on your preference). See the next section, Introduction to the Disk Administrator, describing the NT Disk Administrator for information on how to do this.

B.6.2 Introduction to the Disk Administrator

Follow these instructions:

1. From the Administrative Tools group, open **Disk Administrator**.

2. When it prompts you asking to signature unmarked drives, select **OK** or **YES**.
3. NT will now display your hard drives and partitions in a graphical manner.
4. If you followed the partitioning scheme in this document, you should see a small partition listed as FAT and a large partition listed as NTFS; any other partitions will be listed as Unpartitioned.

B.6.3 Creating a partition with Disk Administrator

To create a partition on an unpartitioned space, highlight the unpartitioned space (Bold black lines should indicate the partition is highlighted).

Follow these instructions:

1. From the File Menu, select **Create...**
2. Specify the amount of disk space, by default it uses the entire space.
3. NT will now prompt to restart.
4. After restarting, re-run Disk Administrator.
5. Select the new partition.
6. From the Tools menu, select **Format**.
7. Choose FAT or NTFS, and NT will format the new partition.

B.6.4 Creating a Volume Set

Follow these instructions:

1. Select all unpartitioned spaces that you want to make a single volume: Hold down the <CTRL> key and select each unpartitioned space.
2. You should now have two or more highlighted partitions; these will become a single drive letter.
3. From the File Menu, select **Create Volume Set...**

NT automatically adds the total amount of space from all selected drives.

4. Select **OK**.

NT will now prompt to restart.

5. After restarting, re-run Disk Administrator.
6. Select the new partition.

Note: NT automatically highlights all the participating drives and partitions in the set.

7. From the Tools menu, select **Format**.
8. Choose FAT or NTFS, and NT will format the new partition.

B.7 Final notes on Disk Administrator

IMPORTANT: After making changes to partitions, NT will recommend creating a new Emergency Disk. This is essential!

Follow these instructions:

1. After NT restarts, open the Command Prompt from the Program Manager.
2. Type RDISK at the prompt.
3. Select **Create Repair Disk**, and follow the prompts.

Appendix C: Windows 95 Installation

Note: Read all on-screen prompts fully and carefully. Do not simply follow this guide step-for-step.

C.1 Check Configuration of Video Adapter

Use Control Panel/Display:

1. Select monitor & video board.
2. Configure video board.

Use manufacturer's driver on diskette 1024x768 pixels(recommended), 16 million colors (24-bit True color, required), small fonts.

C.2 Configure Network

Use Control Panel/Network:

1. Computer ID
Computer name: WAS-xxx
Workgroup: WAS_IM_WG
Computer description: WSxxx...
2. Check that correct Ethernet card is displayed.
3. Select client for Microsoft Networks.
4. Check Domain logon box, if your site uses a Windows NT Domain login for Microsoft Networks.
5. Select protocols: TCP/IP

Configure TCP/IP (listed addresses are **EXAMPLES** only).

- IP Address: 152.128.xxx.xxx or check DHCP box if you are using a DHCP server.
- Sub-net mask: 255.255.255.128
- Default gateway: 152.128.xxx.xxx (must be on same subnet as workstation IP address).
- DNS: NSx.VA.GOV

6. Turn off caching of passwords.
7. Use marquee 20 minutes. Enter text: “**VISTA** Medical Imaging”.
Set at...

Slowest speed
 - Light blue background
 - Font largest size
 - Black Italic
 - Bold Times New Roman
8. Use Microsoft Tweak UI to automate the login process or use no password.
9. Configure screen saver. Select light blue background color.
10. Configure screen appearance.
11. Reboot & continue.
12. Install terminal emulator software.
13. Configure a session for connection to **VISTA** M System. Use the session file for other workstations.
14. Install anti-virus software. Follow VA NCIS recommended guidelines for installation and configuration. Set Recycle Bin to zero percent or check “Do not move files to recycle bin”.
15. Remove all entries from Taskbar except **VISTA** Imaging Programs and any other options users may access.
16. Rename terminal emulator entry on toolbar to “**VISTA** Hospital System”.
17. **Reboot.**
18. **Install WinShield.**
19. Select all security options for default user.
20. Configure alternate user with no restrictions for support staff use.
21. Enter passwords.

22. Use “template” for alternate & “switched off” modes.
23. Test Station.
 - a. Reboot to default user of WinShield.
 - b. Check that only START button appears.
 - c. Run all installed software from Taskbar.
 - d. Check that images are displayed & captured.
24. Reboot and go into BIOS setup.
25. Disable floppy disk drive(s) Set CMOS password. Be sure this password is recorded in IRM.

Note: There have been a number of cases where users have set this password, thereby locking IRM out.

Appendix D: Security

D.1 Security Summary

D.2 Workstation Security

If configured properly, the imaging software will control the users' access to image files on the file server.

D.2.1 Introduction

The VA recommends McAfee VirusScan by McAfee Associates, Inc., for virus protection on workstations. In addition, on Windows 95 workstations, WinShield by Citadel is required to restrict users access to system setup and files. Documentation of installation of WinShield will be provided subsequently.

Under Windows NT 4.0, the Imaging software will be providing application-based protection for image files. This will be available in the 32-bit version of Imaging.

D.2.2 BIOS Changes

D.2.3 McAfee

The VA recommends McAfee VirusScan by McAfee Associates, Inc., for virus protection on workstations. Contact security service for further details.

D.2.4 WinShield

On Windows 95 workstations, WinShield by Citadel is required to restrict users access to system setup and files. Each WinShield disk is encoded with a serial number and only that diskette (or a copy of it) will be able to change or uninstall your WinShield settings. It is recommended that the original disk be copied, and only the copy be used for support purposes.

It is suggested that the Default Setup be used by all **VISTA** medical users. The Alternate Setup (and its password) should be configured for support staff. The Temporarily Switch Off mode (and its password) should be reserved for the network administrator's use.

Passwords are case sensitive; it is recommended that the support passwords be created using upper and lower case (with a portion of the password that is unique to each workstation).

e.g., *numericfieldWorkstationXXX* (XXX is the ID of the workstation)

The selection of WinShield options for Default and Alternate Setup is accomplished by using check boxes for each category (appears as a Tab folder) of restrictions.

D.2.4.1 Tab Categories

- Appearance
- CD-ROMs
- Diskettes
- Explorer
- Network
- Printer
- Sharing
- Start Menu
- System

The following sections provide tables that contain the configuration settings for WinShield.

D.2.4.1.1 Appearance

Setting	Description of Option
Check	Prevent screen saver changes.
Check	Prevent wallpaper changes.
Check	Prevent display resolution changes.
Check	Prevent general appearance changes.

D.2.4.1.2 CD-ROMs

Setting	Description of Option
	No restrictions.
Check	Prevent use of CD-ROMs.
Optional (for patient-care software)	Only allow access to the following CD-ROMs.

D.2.4.1.3 Diskettes

Setting	Description of Option
Check	Recognition: Prevent the diskette drive from recognizing any disks.
When Imaging software is available for Image download...	Forced Saves: Constrain all file saving to diskettes only.

D.2.4.1.4 Explorer

Setting	Description of Option
Check	Shield all icons on the Explorer desktop.
Check	Restore icon positions at shutdown.
Check	Shield all drive icons in My Computer's window.
Check	Shield Control Panels & Printers folders.

D.2.4.1.5 Network

Setting	Description of Option
Check	Allow in Network Neighborhood – Nothing.
	Local machine only.
	Local machine and workgroup.
	Entire network.
Check	Freeze network hardware & software configuration settings.
Check	Prevent remote administration of this computer over the network.

D.2.4.1.6 Printer

Setting	Description of Option
Check	Freeze driver, port & spool settings.
Check	Disable deletion of printers.
Check	Disable addition of printers.

D.2.4.1.7 Sharing

Setting	Description of Option
Check	Prevent all file sharing.
Check	Prevent all print sharing.
Check	Prevent dial-in networking.
Check	Freeze shared access control settings.
Check	Freeze user-customizable desktop settings.

D.2.4.1.8 Start Menu

Setting	Description of Option
Check	Documents
Check	Settings
Check	Find
Check	Run
	Shut Down
Check	Prevent Start menu customization.

D.2.4.1.9 System

Setting	Description of Option
Check	Shield access to MS-DOS (uncheck for ATVISTA capture PC).
Check	Prevent hardware driver deletion or changes.
Check	Prevent creation of hardware profiles.
Check	Prevent registry-editing tools.
Check	Freeze system performance settings.
Check	Freeze the computer's identity.
Check	Prevent date & time changes.

D.2.5 Windows NT

For Windows NT systems, a site can limit access to files and options on the workstation by using system policies and profiles. A description of these features is provided below (For more detailed information, see your Windows NT resource guide).

D.2.5.1 Managing User Work Environments

User work environments include the desktop items and settings, (i.e., screen colors, mouse settings, window size and position, and network and printer connections).

You can use the tools listed in the following sections to manage user work environments on a Windows NT network.

D.2.5.1.1 User Profiles

The user profile contains all user-definable settings for the work environment of a computer running Windows NT, including display settings and network connections. All user-specific settings are automatically saved into the Profiles folder within the system root folder (typically C:\winnt\profiles).

D.2.5.1.2 System Policy Editor

System policy enables you to control the user-definable settings in Windows NT and Windows 95 user profiles, as well as system configuration settings. You can use the System Policy Editor to change desktop settings and restrict what users can do from their desktops.

D.2.5.1.3 Logon Scripts

A logon script is a batch file (.bat) or executable (.exe) file that runs whenever a user logs on at any type of workstation on the network. The script can contain operating system commands (i.e., commands to make network connections or start applications).

D.2.5.1.4 Environment Variables

Environment variables specify the computer's search path, directory for temporary files, and other similar information.

D.2.5.2 User Profiles

On computers running Windows NT Workstation or Windows NT Server, user profiles automatically create and maintain the desktop settings for each user's work environment on the local computer. A user profile is created for each user when the user logs on to a computer for the first time.

User profiles provide several advantages to users:

- When users log on to their workstations, they receive the desktop settings as they existed when they logged off.
- Several users can use the same computer; and each user receives a customized desktop when they log on.

If you have a computer running Windows NT Server on your network, user profiles can be stored on a server so that user profiles can follow users to any computer running the Windows NT version 4.0 platform on the network. These are called roaming user profiles. You can also assign mandatory user profiles to prevent users from changing any desktop settings (For more information about roaming user profiles and mandatory user profiles, see Chapter 3, "Managing User Work Environments" in Windows NT Server version 4.0 Concepts and Planning).

D.2.5.2.1 Settings Saved in a User Profile

A user profile contains configuration preferences and options for each user (A snapshot of a user's desktop environment).

The following table describes the settings in a user profile:

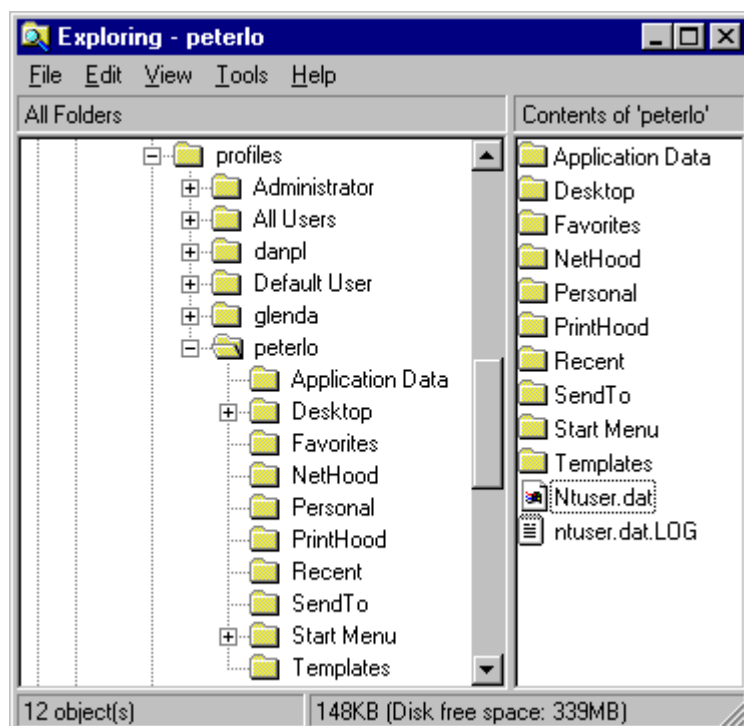
Source	Parameters Saved
Windows NT Explorer	All user-definable settings for Windows NT Explorer.
Taskbar	All personal program groups and their properties, all program items and their properties, and all Taskbar settings.
Printers Settings	Network printer connections.
Control Panel	All user-defined settings made in Control Panel.
Accessories	All user-specific application settings affecting the user's Windows NT environment, including Calculator, Clock, Notepad, Paint, and HyperTerminal, among others.
Windows NT-based applications	Any application written specifically for Windows can be designed so that it tracks application settings on a per-user basis. If this information exists, it is saved in the user profile.
Online Help bookmarks	Any bookmarks placed in the Windows NT Help system.

D.2.5.2.2 Structure of a User Profile

User profiles are comprised of the profile directory, a cached copy of the Windows NT Registry HKEY_CURRENT_USER subtree, and the common program groups, contained in the All Users folder.

D.2.5.2.3 User Profile Folders

Every user profile begins as a copy of Default User, a default user profile stored on each computer running Windows NT Workstation or Windows NT Server. The Default User profile folder, user profile folders for each user, and All User profile folders are located in the Profiles folder in the system root (usually C:\Winnt). The Default User folder and individual user profile folders contain an Ntuser.dat file, plus a directory of links to desktop items.



Note: The user profiles folders contain links to various desktop items.

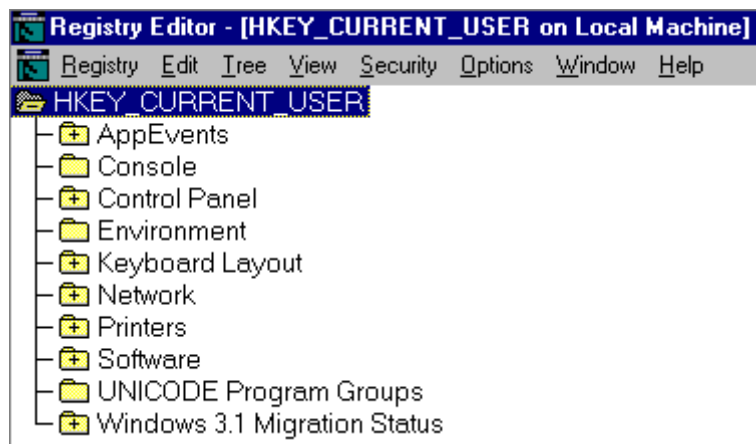
User Profile Folder	Contents
Application Data	Application-specific data. For example, a customer dictionary. Application vendors decide what data to store in the User Profile folder.
Desktop	Desktop items, including files and shortcuts.
Favorites	Shortcuts to program items and favorite

User Profile Folder	Contents
	locations.
NetHood	Shortcuts to Network Neighborhood items.
Personal	Shortcuts to program items.
PrintHood	Shortcuts to printer folder items.
Recent	Shortcuts to the most recently used items.
SendTo	Shortcuts to document items.
Start Menu	Shortcuts to program items.
Templates	Shortcuts to template items.

Note: The NetHood, PrintHood, Recent, and Templates folders are hidden and, by default, do not appear in Windows NT Explorer. To view these folders and their contents in Windows Explorer, click Options on the View menu, and then click Show all files.

D.2.5.2.4 NTuser.dat File

The NTuser.dat file is the registry portion of the user profile. NTuser.dat is a cached copy of the Windows NT Registry HKEY_CURRENT_USER subtree on the local computer. The registry is a database repository for information about the computer's configuration, including the hardware, installed software, environment settings, and other information. In the registry, the settings that determine the work environment for the user who is currently logged on to the computer are stored in HKEY_CURRENT_USER.



Note: Although they are not copied to user profile folders, the settings in the All Users folder are used with user profile folders to create the user profile.

The Windows NT platform supports two program group types:

- Common program groups are always available on a computer, no matter who is logged on. Only administrators can add, delete, and modify them.
- Personal program groups are private to the user who creates them.

Common program groups are stored in the All Users folder under the Profiles folder. The All Users folder also contains settings for the Desktop and Start menu.

On computers running Windows NT Workstation or Windows NT Server, only members of the Administrators group can create common program groups.

For information on adding new program groups, see "To add a new submenu to the Programs menu" in Windows NT Help.

Note: For more information on configuring NT policies and profiles, refer to the Windows NT Resource Guide.

D.2.6 Imaging Software

If configured properly, the imaging software will connect to the file server shares to store or retrieve images. The user who is logged into the workstation will not have access to those shares. This requires the user to be logged into the workstation as a generic user (vhaimageuser) with a different password than that used on the imaging file server. The password for the file server is retrieved by the imaging

application from the **VISTA** system (imaging site parameter file (2006.1), Net Password field).

e.g., The user logs into the workstation as vhaimageuser with a password of VHAIMAGEUSER. The imaging display application is executed. When the user requests images for a particular patient, the application looks up the imaging file server password in the site parameter file, and then makes a connection to the file server (using the correct password) and retrieves the files it needs. It then disconnects from the file server.

Note: It is very important that this be configured correctly to insure proper protection on the patient image files.

D.2.7 Physical Protection

All systems should be physically locked to protect them from being stolen. Sites have reported many instances of equipment that has “disappeared” from its location.

D.2.8 Medical Center Policy

Many medical centers have a strict policy for users that will have access to clinical workstations. Any user that will obtain access to the system must sign a form that states the policy for the site.

D.3 Windows NT Server Security

Be sure to change the default passwords for the administrator and guest accounts. Imaging users will not log into the imaging file servers; they will be accessed only through shares.

D.3.1 Directory and Share Security

Directory and share security is used to control access to the image files. If the system is configured properly, only the imaging application and the NT administrator (or equivalent) will have access to the directories and shares that contain images.

D.3.2 Hidden Shares

Hidden shares are used for image directories on the imaging file server so they will not show up in the browse list of any client workstation.

D.4 Backups

The **VISTA** Imaging V. 2.0 software saves patient images as part of the patient's electronic record. Backing up the Imaging servers (i.e., magnetic drives and SQL database) is necessary. The following table presents recommendations from the Imaging staff:

Equipment/ Software	Frequency	Type	Media Type	Comments
NT Operating System	weekly	Full	Tape	
SQL Database (master and DEX databases)	daily	Disk Dump	Disk	Performed late at night because it locks the database and should be performed prior to backing up the magnetic drives (See Jukebox section for details).
Magnetic Drives	daily	Incremental by date	tape	Backup new images captured since the last backup was performed. Backup tapes should be stored off site. Do not overwrite.
JukeBox	none			

Remember to backup other systems that produce images for **VISTA** Imaging (i.e., MUSE, PACS, Dental System).

Note: Prior to using the Imaging Purge function, be sure that all the Imaging servers have been backed up.

Appendix E: Matrox Meteor Installation

E.1 Installing Matrox Meteor MIL32 drivers on an NT Workstation

1. Run setup file, magmet.exe.
2. Copy the meteor.sys and the mildrv.exe files into a \Meteor\ Drivernt directory (create it if it doesn't exist). Register the meteor driver using the mildrv command line utility, allocating 6144 DMA buffers and replacing any previous value.

```
c:\Meteor\Drivernt> mildrv meteor 6144 replace
```

3. Reboot the PC and note any Event Viewer messages.

E.2 Installing Matrox Meteor MIL32 drivers on a Windows 95 Workstation

1. Run setup file, magmet.exe.
2. If you had already installed the board and booted Win95 before copying the previously listed files onto the system, you must remove the entry in the system registry that Win95 created automatically when the system was booted. Go to the Win95 Control Panel and double click on the System icon. This will bring you to the System Properties dialog box. Click on the device manager tab and look for a Unknown Devices entry. Under that entry, you should see an Unknown Video Adapter entry - remove this one by single clicking on it and clicking the Remove button. Shutdown the workstation.
3. If you haven't already done so, install the Meteor board.
4. Restart Win95 and you should see the Meteor driver register automatically.
5. Click on Start | Run and type: vxdsins.exe c:\windows\system\meteor.inf 3072 (this will register the meteor driver).

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